FOR·THE·INCREASE·
AND·DIFFVSION·OF·
KNOWLEDGE·AMONG·MEN·
PER·
ORBEM
SMITHSONIAN·
INSTITVTION·
WASHINGTON·1846·

SHOUT
SHARE
IT

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
Bulletin 95

THE FISHES OF THE WEST COAST OF PERU AND THE TITICACA BASIN

BY

BARTON WARREN EVERMANN
Director, Museum of the California Academy of Sciences
AND
LEWIS RADCLIFFE
Assistant, United States Bureau of Fisheries

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
Bulletin 95

THE FISHES OF THE WEST COAST OF PERU AND THE TITICACA BASIN

BY

BARTON WARREN EVERMANN
Director, Museum of the California Academy of Sciences

AND

LEWIS RADCLIFFE
Assistant, United States Bureau of Fisheries

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

BULLETIN OF THE UNITED STATES NATIONAL MUSEUM.

Issued August 1, 1917.

ADVERTISEMENT.

The scientific publications of the United States National Museum consist of two series, the *Proceedings* and the *Bulletins*.

The *Proceedings*, the first volume of which was issued in 1878, are intended primarily as a medium for the publication of original, and usually brief, papers based on the collections of the National Museum, presenting newly acquired facts in zoology, geology, and anthropology, including descriptions of new forms of animals, and revisions of limited groups. One or two volumes are issued annually and distributed to libraries and scientific organizations. A limited number of copies of each paper, in pamphlet form, is distributed to specialists and others interested in the different subjects as soon as printed. The date of publication is printed on each paper, and these dates are also recorded in the tables of contents of the volumes.

The *Bulletins*, the first of which was issued in 1875, consist of a series of separate publications comprising chiefly monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal works, reports of expeditions, and catalogues of type-specimens, special collections, etc. The majority of the volumes are octavos, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable.

Since 1902 a series of octavo volumes containing papers relating to the botanical collections of the Museum, and known as the *Contributions from the National Herbarium*, has been published as bulletins.

The present work forms No. 95 of the *Bulletin* series.

Richard Rathbun,
Assistant Secretary, Smithsonian Institution,
In charge of the United States National Museum.

Washington, D. C., April 18, 1917.

TABLE OF CONTENTS.

	Page.
Introduction	1
Description of species	2
Family Heterodontidae	2
Genus Gyropleurodus	2
peruanus	2
Family Scylliorhinidae	3
Genus Halaelurus	3
chilensis	3
Genus Sphyrna	5
zygaena	5
Genus Mustelus	5
mento	6
abbotti	6
dorsalis	7
nigromaculatus	9
Genus Galeus	10
zyopterus	10
Family Squatinidae	11
Genus Squatina	11
squatina	11
Genus Rhinobatus	12
planiceps	12
Family Rajidæ	13
Genus Raja	13
aguja	14
steindachneri	14
Genus Psammobatis	16
brevicaudatus	16
Genus Discopyge	16
tschudii	16
Genus Pteroplatea	16
crebripunctata	16
Genus Myliobatis	17
californicus	17
Genus Callorhynchus	18
callorhynchus	18
Family Clupeidae	19
Genus Potamalosa	19
notacanthoides	19
Genus Sardinella	20
sagax	20
Genus Harengula	21
stolifera	21

Page.
Family Engraulidae 22
Genus Stolephorus 22
tapirulus 23
peruanus 23
Genus Engraulis 23
ringens 23
Nasus 24
Family Leptocephalidae 24
Genus Leptocephalus 24
multimaculatus 24
peruanus 24
Genus Ophichthus 24
grandimaculatus 24
callaensis 25
pacifici 25
Genus Gymnothorax 26
wieneri 26
Family Characinidae 27
Genus Brycon 27
atricaudatus 27
Genus Astyanax 27
peruanus 27
Genus Lebiasina 29
bimaculata 29
Family Siluridae 30
Genus Galeichthys 30
peruvianus 31
simonsi 31
Genus Tachysurus 32
equatorialis 32
Genus Rhamdia 33
gilli 33
Genus Pimelodella 33
yuncensis 33
Genus Pygidium 33
poeyanum 34
rivulatum 34
taenia 35
laticeps 35
oroyae 35
dispar 35
punctulatum 35
pardum 36
quechuorum 36
Family Loricariidae 37
Genus Chaetostomus 37
loborhynchus 37
Genus Cyclopium 37
simonsii 37
Family Poeciliidae 37
Genus Aplocheilus 37
peruanus 37
Genus Orestias 37
cuvieri 38
pentlandii 39

Family Poeciliidae—Continued.
Genus Orestias—Continued. Page.
elegans 40
mülleri 40
tschudii 40
agassizii 40
owenii 42
olivaceus 42
albus 42
neveui 42
luteus 42
jussiei 42
incae 42
Family Belonidae 43
Genus Tylosurus 43
stolzmanni 43
Family Hemirhamphidae 43
Genus Hyporhamphus 43
unifasciatus 43
Family Exocoetidae 43
Genus Exocoetus 44
volitans 44
Genus Cypsilurus 44
speculiger 44
Family Atherinidae 45
Genus Atherinopsis 45
regius 45
Genus Protistius 46
semitilus 46
Genus Basilichthys 47
affinis 47
octavius 49
Family Mugilidae 49
Genus Mugil 49
cephalus 49
Genus Neomyxus 51
ciliilabis 51
Family Sphyraenidae 51
Genus Sphyraena 51
idiastes 51
Family Polynemidae 52
Genus Polydactylus 52
approximans 52
Family Syngnathidae 53
Genus Siphostoma 53
aciculare 53
blainvilliana 53
Family Scombridae 53
Genus Scomber 54
japonicus 54
Genus Sarda 55
chilensis 55
Genus Scomberomorus 55
sierra 55

Page.
Family Xiphiidae 56
Genus Xiphias 56
gladius 56
Family Carangidae 56
Genus Neptomenus 57
crassus 57
Genus Seriola 58
peruana 58
Genus Decapterus 58
scombrinus 58
Genus Trachurus 59
symmetricus 59
Genus Caranx 61
caballus 61
peruanus 62
Genus Vomer 62
setipinnis 62
Genus Selene 62
vomer 62
Genus Trachinotus 62
paloma 62
Family Stromateidae 63
Genus Leirus 63
peruanus 63
Genus Stromateus 64
maculatus 64
Family Cheilodipteridae 64
Genus Amia 64
retrosella 64
Family Serranidae 65
Genus Acanthistius 66
pictus 66
Genus Hemilutjanus 67
macrophthalmos 67
Genus Epinephelus 69
labriformis 69
Genus Alphestes 69
multiguttatus 69
Genus Mycteroperca 70
xenarcha 70
Genus Epelytes 71
punctatus 71
Genus Cratinus 72
agassizii 72
Genus Paralabrax 73
humeralis 73
callaensis 74
Genus Diplectrum 75
conceptione 75
Genus Prionodes 76
fasciatus 77
huascarii 78
peruanus 78
Genus Paranthias 78
furcifer 78

Family Serranidae—Continued. Page.
Genus Hemianthias ... 79
peruanus ... 79
Family Haemulidae ... 80
Genus Anisotremus ... 80
pacifici ... 81
scapularis ... 81
Genus Conodon ... 82
serrifer ... 82
Genus Brachydeuterus ... 83
nitidus ... 83
leuciscus ... 84
Genus Pomadasis ... 85
schyri ... 85
branicki ... 86
Genus Orthopristis ... 87
chalceus ... 87
modestus ... 88
Genus Isacia ... 89
conceptonis ... 89
Family Sparidae ... 91
Genus Calamus ... 91
taurinus ... 91
Family Gerridae ... 91
Genus Xystaema ... 91
simillimum ... 91
Genus Gerres ... 92
peruvianus ... 92
periche ... 93
Family Kyphosidae ... 94
Genus Doydixodon ... 94
laevifrons ... 94
Family Scaenidae ... 95
Genus Cynoscion ... 96
analis ... 96
stolzmanni ... 97
phoxocephalus ... 97
Genus Larimus ... 98
pacificus ... 98
Genus Stellifer ... 99
minor ... 99
Genus Sciaena ... 101
fasciata ... 101
deliciosa ... 102
gilberti ... 103
starksi ... 104
wieneri ... 105
Genus Umbrina ... 105
xanti ... 105
Genus Menticirrhus ... 106
panamensis ... 106
cokeri ... 107
Genus Polyclemus ... 108
peruanus ... 109

Page.
Family Oplegnathidae 109
Genus Oplegnathus 109
insignis 109
Family Latilidae 110
Genus Caulolatilus 110
princeps 110
cabezon 111
Family Pinguipedidae 112
Genus Pinguipes 112
chilensis 112
Family Cirrhitidae 113
Genus Cheilodactylus 113
variegatus 113
Family Aplodactylidae 115
Genus Aplodactylus 115
punctatus 115
Family Cichilidae 116
Genus Aequidens 116
rivulatus 116
Family Pomacentridae 117
Genus Chromis 117
atrilobatus 117
crusma 118
intercrusma 119
Genus Nexilosus 121
latifrons 121
Genus Abudefduf 123
saxatilis 123
Family Labridae 123
Genus Bodianus 123
diplotaenius 124
eclancheri 125
Genus Pimelometopon 127
darwinii 127
Genus Halichoeres 128
dispilus 128
Family Scaridae 129
Genus Xenoscarus 129
denticulatus 129
Family Balistidae 130
Genus Balistes 131
polylepis 131
Genus Canthidermis 131
adspersus 131
Family Tetraodontidae 132
Genus Spheroides 132
annulatus 132
Family Gobiidae 133
Genus Philypnus 133
maculatus 133
Genus Mapo 134
soporator 134
Genus Gobiodes 134
peruanus 134

Page.
Family Echeneididae 135
Genus Echeneis 135
remora 135
Family Scorpaenidae 136
Genus Sebastichthys 136
chamaco 136
darwini 137
Genus Scorpaena 137
histrio 137
Genus Pontinus 138
dubius 138
Family Agriopodidae 139
Genus Agriopus 139
peruvianus 139
Family Pleuronectidae 140
Genus Paralichthys 140
adspersus 140
woolmani 140
Genus Citharichthys 141
gilberti 141
Genus Etropus 142
ectenes 142
Family Blenniidae 142
Genus Lepisoma 143
xanti 143
philippi 144
peruviana 145
microcirrhis 146
Genus Blennius 146
tetranemus 146
Genus Hypleurochilus 146
paytensis 146
Genus Alticus 146
gigas 146
Genus Salarias 147
rubropunctatus 147
Genus Emblemaria 147
hudsoni 147
Family Ophidiidae 149
Genus Genypterus 149
blacodes 149
chilensis 150
Family Brotulidae 151
Genus Brotula 151
maculata 151
Genus Porichthys 152
afuerae 152
Family Gobiesocidae 153
Genus Gobiesox 153
sanguineus 153
Genus Arbaciosa 155
pyrrhocincla 155
hieroglyphica 155
Family Merlucciidae 156
Genus Merluccius 156
gayi 156
Index 159

THE FISHES OF THE WEST COAST OF PERU AND THE TITICACA BASIN.

By Barton Warren Evermann,
Director, Museum of the California Academy of Sciences,

and

Lewis Radcliffe,
Assistant, United States Bureau of Fisheries.

INTRODUCTION.

While engaged in 1907 and 1908 under the auspices of the Peruvian Government in an investigation of the fisheries and fishery resources of Peru, Dr. Robert E. Coker embraced the opportunity to make collections of the fishes inhabiting the streams and coastal waters of that country.

The principal localities in which collections were made are Ancon, Eten, Callao, Capon, Chimbote, Chincha Island, Guanape North Island, Lake Titicaca, Lima market, Lobos de Afuera, Lobos de Tierra, Mollendo, Pacasmayo, Paita, Rimac River, Santa Rosa Island, Tumbes and Tumbes River, and Ballestas Island. The largest number of species (28) was obtained at Lobos de Afuera.

These collections were turned over to the present writers for study and the preparation of a report thereon. They represent, in the aggregate, the largest and most important collection of fishes ever obtained in those waters. The total number of specimens somewhat exceeds 500. The number of species represented is 120, of which 12 appear to be new.

In the present report the authors have included not only the species represented in Doctor Coker's collections, but all others previously actually recorded from the Pacific coast and drainage of Peru and from the Titicaca Basin. This brings the total number of species known from Peruvian waters to 187.

Through the generosity of the Peruvian Government the authors are able to include illustrations from original drawings of 40 of the species.

The collections are now deposited in the United States National Museum. The original drawings were made by Mr. Kako Morita and Miss Violet Dandridge.

The common species names given are local or vernacular names supplied by Doctor Coker.

The writers take this opportunity to express their appreciation of aid rendered and courtesies extended to them by the Hon. Eduardo Higginson, Peruvian consul general at New York, and to Dr. Robert E. Coker, director of the Fairport (Iowa) Biological Laboratory of the Bureau of Fisheries.

Acknowledgement should be made to Señor Don Carlos Larrabure y Correa, director of public works for the Peruvian Government, whose breadth of interest and effective energy have made possible the study and report on the collections in the present form.

DESCRIPTION OF SPECIES.

Family HETERODONTIDAE.

THE BULLHEAD SHARKS.

Not until now has any species of this family been reported from Peruvian waters. Doctor Coker's collections contains a single specimen which does not belong to any previously described species.

Genus GYROPLEURODUS Gill.

1. GYROPLEURODUS PERUANUS, new species.

GATO; SUÑO.

Plate 1, fig. 1.

A single specimen, the type, Cat. No. 77691, U. S. Nat. Mus. (field No. 09509), 56.5 cm. in length, from Lobos de Tierra.

Length of head to branchial region, 5.25 in total length; depth 5.6; eye 6.75 in head; interocular 2.07; snout 1.9; length of first gill opening 3.66; length of fifth gill opening one-half that of first. Body robust anteriorly, tapering posteriorly; caudal peduncle slender, its depth about one-fifth length of head; head short and stout, nearly as broad as long; snout blunt, ridges from tip of snout converging for half the distance to eyes, thence diverging and merging into the strong supraorbital ridges, the latter terminating just behind the eyes; interorbital concave. Teeth in front of jaws tricuspid, the middle cusps strongest, arranged in about six converging rows; behind these on the sides of the jaws there are five oblique rows of elongate, carinate teeth, each cross series composed of five teeth, the whole patch rhomboidal in outline; eyes small, in a groove between the overhanging supraorbital ridge and the tumid cheek. Origin of first dorsal posterior in its insertion to the vertical from posterior base of pectoral; distance from tip of snout to its insertion 2.75 in total length of body; distal portion rounded and not lunate as in *G. galeatus*, its height 2.62 in length of head; length of base, 2.2; first dorsal spine very stout and blunt, its height one-

half that of soft dorsal; distance from insertion of first to second dorsal, 3.81 in total length; height of second dorsal, 3.1 in head; base 2.8; height of spine, 1.4 in that of fin, distal portion of fin truncate; distance from insertion of second dorsal to tip of caudal, 2.76 in total length; caudal broad, a notch at tip, opposite last vertebra; pectoral very large, the broad truncate distal portion extending beyond vertical from insertion of first dorsal, pectoral longer than head, 4.42 in total length; distance from tip of snout to insertion of pectoral, 4.8 in total length; ventrals large, inserted slightly behind the vertical from posterior base of first dorsal, length 1.8 in length of pectoral; distance from insertion of pectorals to insertion of ventrals 3.64 in total length; insertion of anal under vertical from middle of free part of the backward prolongation of second dorsal, its length 1.66 in head, its tip extending beyond the origin of the caudal. Scales of the back and sides black and olivaceous, the greater number of those on back black, giving the dorsal surface a much darker coloring than sides; belly light olivaceous; body and fins everywhere covered with numerous black spots of varying sizes, their diameter less than horizontal diameter of eye; six indistinct dark crossbands on back, the first above gill openings, the second in front of dorsal, the third under posterior end of first dorsal, fourth in front of origin of second dorsal, the fifth under second dorsal, and the sixth on caudal peduncle in front of base of caudal; fins similar in coloration to body.

Color in life, "a dirty brown, blotched and spotted with black; ventral surface pale, but spotted with black."

This species appears to be most closely related to the poorly described *G. quoyi*, but differs in coloration, in insertion of anal, and relative size of pectoral. In *G. francisci*, the dorsal is more anterior in its insertion, the anterior gill-slit is shorter, and the black spots are smaller.

Family SCYLLIORHINIDAE.

THE CAT SHARKS.

Genus HALAELURUS Gill.

2. HALAELURUS CHILENSIS (Guichenot).

PEJE-GATO.

Scyllium chilense Guichenot in Gay, Hist. Chile, Zool., vol. 2, 1848, p. 362.—Günther, Cat., Fish. Brit. Mus., vol. 8, 1870, p. 405.—Philippi, Ann. Univ. Chile, vol. 71, 1887, p. 556, pl. 7, fig. 4.—Vaillant, Miss. Sci. Cape Horn, Zool. Poiss., 1891, p. 10, pl. 1, figs. 1–2.

Scylliorhinus chilensis Delfin (part), Cat. Peces de Chile, 1901, p. 15.

Scyliorhinus chilensis Regan, Synopsis Sharks Fam. Scyliorhinidae, Ann. Mag. Nat. Hist., ser. 8, vol. 1, 1908, p. 462.

Two specimens, a female, field No. 09702, and a male, field No. 09710, respectively 50.7 and 55.7 cm. in length, from Mollendo.

Following are the dimensions of these two individuals:

	Female.	Male.
	mm.	*mm.*
Total length	507	557
Tip of snout to origin of first dorsal	210	240
Base of first dorsal	42	39
Posterior base of first dorsal to origin second dorsal	65	73
Base of second dorsal	47	52
Base of second dorsal to origin caudal	57	55
Length of caudal	86	98
Length anterior margin first dorsal	50	58
Length anterior margin second dorsal	59	61
Tip of snout to eye	29	34
Eye	12½	14
Interorbital	31	35
Tip of snout to first gill-opening	76	90
Tip of snout to nearest point of mouth	19	20
Angle of mouth to center of upper lip	31	37
Length of labial fold of upper lip	12	17
Length of labial fold of lower lip	13	17
Tip of snout to origin pectoral	91	105
Length of pectoral	54	60
Origin of pectoral to origin of ventral	104	110
Length of ventral	46	61
Origin ventral to origin anal	203	224
Length of anal	40	41
Base of anal	36	39

Head broad and depressed; snout blunt, projecting little beyond mouth; mouth broad, the arch greater in male than in female; teeth small, with indistinct lateral cusps; nasal valves not confluent, separated from each other by a considerable interspace, with a downward twist, the outer border broadly rounded, the inner somewhat notched; no cirrus; each jaw with a labial fold extending from angle of mouth for about one-half its length; caudal peduncle long and slender.

Origin of dorsal opposite posterior base of ventrals; origin of second dorsal opposite middle of ventrals; first dorsal somewhat higher in male than female. Some of the granulations along ridge of back on either side of median line somewhat larger than the others; a ridge of enlarged tubercles above eye.

Color of male in spirits, back bluish black, becoming yellowish on ventral surface; dorsal surface crossed by seven broad rhombic black transverse blotches, first over origin of pectoral, second above tip of pectoral, third under first dorsal, fourth midway between first and second dorsal, fifth under second dorsal, sixth midway between second dorsal and base of caudal, and seventh across base of caudal; head, back, sides, and fins with large black spots; an indistinct dark band across head, through eyes; some lighter yellowish spots on sides. In the female, the interspace between the black crossbands on back is much lighter, of a yellowish tinge, similar to belly.

In these individuals the anterior nasal valves are not acutely pointed as stated by Regan and figured by Vaillant, but rounded.

Genus SPHYRNA Rafinesque.

3. SPHYRNA ZYGAENA (Linnaeus).

CRUZ.

Squalus zygaeno LINNAEUS, Syst. Nat., ed. 10, 1758, p. 234; Europe; America.
Zygaena malleus STORER, Fish. Mass., 1867, p. 238.
Sphyrna zygaena JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 45.—GILBERT and STARKS, Fishes of Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 13.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 763; Callao, Peru.
?Zygaena peruana PHILIPPI, Ann. Univ. Chile, vol. 71, 1887, p. 545, pl. 2, fig. 2.
? Sphyrna peruana ABBOTT, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 328.—DELFIN, Cat. Peces de Chile, 1901, p. 18.

Tail and head, field Nos. 09510–11, of a hammerhead shark 100 cm. in length from Lobos de Tierra.

The following dimensions of this individual were taken by Doctor Coker:

	cm.
Snout to origin of first dorsal	28
Base of first dorsal	9
Anterior margin of first dorsal	15
Distance between first and second dorsals	24.5
Base of second dorsal	3
Anterior margin of second dorsal	4
Second dorsal to tip of caudal	38.5
Distal lobe of caudal	30
Anterior margin of ventral	4
Anterior margin of pectoral	12
Width of hammer	26.5
Eye to eye around snout	27.5
Antero-postero length of hammer	6–7.5
Anal to tip of caudal	40

Genus MUSTELUS Cuvier.

KEY TO SPECIES.

a^1. First dorsal inserted anteriorly, the distance between origin of first dorsal and tip of snout about six and two-thirds in total length. Teeth transverse, with a low median keel ..... *mento*, p. 6.

a^2. First dorsal situated farther caudad, the distance from tip of snout to origin of first dorsal less than 4 in total length.

b^1. Coloration variable; oblivaceous, flecked with white or dusky, with about 15 darker crossbands; body robust, snout rather blunt ..... *abbotti*, p. 6.

b^2. Coloration plain olivaceous; head strongly depressed, body slendor; snout pointed ..... *dorsalis*, p. 7.

b^3. Coloration olivaceous, back and sides with black spots; body robust, head not strongly depressed; snout blunt, thick ..... *nigromaculatus*, p. 9.

4. MUSTELUS MENTO Cope.

Mustelus mento Cope, Proc. Amer. Philos. Soc. Phila., 1877, p. 47 (31); Pacasmayo Bay.

Mustelus edulis Perez, C. Estudio Sobre Algunos Escualos Chile, 1886, p. 4.—Philippi, Ann. Univ. Chile, vol. 71, 1887, p. 547.

Galeus mento Abbott, Marine Fishes of Peru in Proc. Acad. Nat. Sci. Phila., 1899, p. 326.

Galeorhinus mento Delfin, Cat. Peces de Chile, 1901, p. 17.—Porter, Breve Nota de Ictiologia, Revista Universitaria, Lima, vol. 3, 1909, p. 138.

From the Pacific Ocean at Pacasmayo, Peru.

5. MUSTELUS ABBOTTI, new species.

TOLLO.

Plate 1, fig. 2.

Galeus dorsalis, Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 327; Callao; not *Mustelus dorsalis* Gill.

Type.—Cat. No. 77696, U.S.N.M., a female, 55 cm. in length (field No. 09115) and a paratype, also a female, No. 09107, 46.5 cm. in length, taken with gill net, fishing in the surf at La Ventanilla between Ancon and Callao.

One specimen (paratype), a young female, field No. 09532, 32 cm. in length, from Lobos de Tierra.

Following are the dimensions of the type and paratypes:

	Type.	Paratype.	Paratype.
	mm.	*mm.*	*mm.*
Total length	550	465	320
Distance from tip of snout to first gill slit	103	87	57
Distance from tip of snout to eye	47.5	42	27.5
Diameter of eye	15	13	10.5
Length of spiracle	5	5	3.5
Breadth of head	57	49	33
Depth of head	35	28	19
Interorbital (bone)	30	24	15
Distance from tip of snout to front of mouth	37	30	21
Distance between nostrils	16	13	9.5
Distance between angles of mouth	33	28	20
Distance from tip of snout to base of dorsal fin (not including the fleshy ridge)	170	140	93
Base of first dorsal	67	55	35
Length of anterior margin of first dorsal (not including broad fleshy base)	.59	51	31
Distance from origin first dorsal to origin second dorsal	177	136	96
Base of second dorsal	60	47	29
Length of anterior margin of second dorsal	48	42	27
Distance from origin second dorsal to base of caudal	114	100	62
Length of upper caudal lobe	105	85	58
Distance from base of notch on lower lobe to its insertion	73	60	42
Distance from tip of snout to insertion of pectorals	119	107	62
Length of anterior margin of pectorals	83	67	44
Breadth of distal margin	69	52	34
Distance from base pectorals to ventral base	125	110	68
Distance from base ventrals to anal base	105	94	66
Base of anal	30	28	18.5
Distance from insertion of anal to base caudal	78	60	39
Depth of body	70	56	37

Body rather strongly arched, caudal peduncle slender; head broad, depressed; snout rounded; spiracle large, 3 in eye; margins of each side of mouth slightly concave; teeth blunt, paved, without cusps, differing greatly in appearance from those of the types of *Mustelus dorsalis*, which have a well-developed cusp on each tooth; labial folds well developed, the outer 1.8 in the distance from its tip to symphysis of lower jaw.

First dorsal high, distal margin slightly concave, tip of posterior lobe reaching vertical from base of ventral; second dorsal smaller but similar in shape to the first dorsal; upper caudal lobe 5.12 in total length; lower lobe slightly concave, anal similar to second dorsal in shape but much smaller, inserted under middle of second dorsal; pectoral large, distal margin straight; ventrals with their inner margin lengthened, longer than outer margin, tips reaching more than half distance to base of anal.

Color in alcohol, olivaceous, tinged with yellowish on ventral surface; dorsal surface flecked with white.

Coloration of field No. 69107 similar to the type.

Color of small male from Lobos de Tierra, silvery plumbeous on back and sides, ventral surface paler; back crossed by about 15 black or dusky crossbands, these reaching lateral line; six of these crossbands in front of the dorsal.

This species has the general form of *Mustelus dorsalis* (the types of which we have examined), differing in having the body and head deeper, and the snout less pointed in individuals of the same size; the lower caudal lobe anterior to the notch, shorter, 7.52 to 7.75 in the total length (6.62 to 6.68 in types of *M. dorsalis*) and in the well-marked differences in the character of the teeth and coloration. The description of individuals from Callao identified by Abbott as *G. dorsalis* agrees in all essential characters with these specimens.

Named for James Francis Abbott in recognition of his valuable contributions to our knowledge of the ichthyology of Peru.

6. MUSTELUS DORSALIS Gill.

Plate 1, fig. 3; plate 2, fig. 1.

TOLLO.

Mustelus dorsalis Gill, Proc. Acad. Nat. Sci. Phila., 1864, p. 149; Panama.
Galeus dorsalis Jordan and Evermann, Fishes North and Mid. Amer., 1896, vol. 1, p. 30.—Gilbert and Starks, Fishes of Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 7, pl. 1, fig. 2, 2*a*. (Not of Abbott.)

One specimen, a male, field No. 09435, 50 cm. in length, from Pacasmayo.

Following are the dimensions of this specimen:

	mm.
Total length	500
Tip of snout to eye	42
Interorbital	24
Eye	13
Tip of snout to anterior margin of mouth	32.5
Tip of snout to anterior gill slit	91
Tip of snout to origin of first dorsal	154
Base of first dorsal	58
Height of first dorsal	46
Origin of first dorsal to origin of second dorsal	158
Origin of second dorsal to base of caudal	101
Tip of snout to origin of pectoral	112
Length of pectorals	81
Origin of pectorals to origin of ventrals	119
Origin of ventrals to origin of anal	105
Length of lower caudal lobe anterior to notch	67
Breadth of head	55
Depth of head between eyes	25
Depth of body	47
Length of spiracle	3.5

Body low, elongate; head broad, strongly depressed; eyes small; spiracle very small, mouth angular; labial folds well developed; teeth with the single median cusp, rather blunt. Dorsal slightly falcate, posterior lobe scarcely reaching vertical from origin of ventrals; second dorsal similar to first, but smaller; upper caudal lobe 5.38 in total length; anal inserted under middle of second dorsal; pectoral broad, tip reaching nearly to posterior base of first dorsal.

A careful comparison of this individual with the type of *M. dorsalis* reveals the following slight differences: The breadth of the head is a little greater, the length of the lower caudal lobe anterior to the notch is shorter; the insertion of the anal is slightly more caudad. The type and paratypes of *dorsalis* are badly shrunken and for this reason the value of these differences is questionable.

Ten embryos, 6 males and 4 females, field No. 09536, 7.8–9.1 cm. long, from Lobos de Tierra. Doctor Coker's notes say that these embryos are from 2 plain sharks measuring about 80 cm. in length. One bore 5, the other 6, embryos. These are too small for certain identification, but agree quite closely with this species. The remnant of the yolk-sac, closely resembling a placenta, still remains in some of these specimens. This character is figured by Waite in the young of *Galeus australis*.[1]

[1] Sci. Res. New Zealand Govt. Trawling Exped., 1907, Records Cant. Mus., vol. 1, 1909, No. 2, pl. 15.

7. MUSTELUS NIGROMACULATUS, new species.

TOLLO.

Plate 2, fig. 2.

Two specimens, males, the type, Cat. No. 77699 U.S.N.M., 50 cm. in length, and a paratype, 51 cm. in length (field Nos. 09527 and 09533), from Lobos de Tierra.

Following are the dimensions of the type and paratype:

	Type.	Paratype.
	mm.	*mm.*
Total length	500	510
Distance from tip of snout to first gill slit	93	91
Distance from tip of snout to eye	42	42
Diameter of eye	13	12
Length of spiracle	4	3.5
Breadth of head	58	56
Depth of head	34	31
Interorbital	27	25
Depth of body	67	68
Distance from tip of snout to front of mouth	29	29
Distance between nostrils	16.5	18
Distance between angles of mouth	35	35
Distance from tip of snout to base of dorsal fin (not including the fleshy ridge)	160	165
Base of first dorsal	64	61
Length of anterior margin of first dorsal (not including broad fleshy base)	53	48
Distance from origin of first dorsal to origin second dorsal	150	162
Base of second dorsal	55	50
Length of anterior margin of second dorsal	49	39
Distance from origin of second dorsal to base of caudal	96	91
Length of upper caudal lobe	99	103
Distance from insertion of lower caudal lobe to notch	75	80
Distance from tip of snout to insertion of pectorals	106	102
Length of anterior margin of pectorals	75	69
Breadth of distal margin	68	53
Distance from base of pectorals to base of ventrals	130	130
Distance from base of ventrals to base of anal	90	96
Base of anal	30	30
Distance from insertion of anal to base of caudal	57	56

Body robust, rather deep; snout blunt, thick, and fleshy; head slightly depressed; mouth wider, more evenly rounded, and nearer tip of snout than in the related species from Peru; teeth with a central blunt or more or less pointed cusp, the majority of those in upper jaw being provided with a lateral cusp posteriorly and a shoulder toward the symphysis, having the general appearance of a cusp worn away, those on the lower jaw approaching more nearly the teeth of *M. abbotti*, the lateral cusps as a rule being less pro-

nounced and lower than those in upper jaw, the central cusp being much blunter and the lateral cusps entirely or nearly lacking in the teeth in front of jaws near symphysis.

The shape of the fins is essentially the same as in *M. abbotti*, from which the present species may be recognized by the marked difference in coloration and the character of the teeth. The first dorsal and the ventrals are inserted farther caudad than in *abbotti*, but have the same relative position with reference to each other; the caudal is longer, thereby lessening the distance between the base of caudal and the second dorsal and anal, the former reaching to within one-half the length of snout to upper base of caudal and the latter to within less than half a diameter of eye to base of lower caudal lobe. The caudal is one-fifth of the total length. The claspers do not reach to the tips of the ventrals.

Color in alcohol, dusky olivaceous, lighter on ventral surface; scattered black spots on back, sides, and base of dorsals.

The paratype agrees closely with the type, the teeth being somewhat blunter, and there are fewer black spots on the sides. Color in life, body with black spots very irregularly disposed, in our specimens more numerous and larger on the left side than on the right.

Genus GALEUS Rafinesque.

S. GALEUS ZYOPTERUS (Jordan and Gilbert).

TOLLO.

Galeorhinus zyopterus JORDAN and GILBERT, Synopsis Fishes North Amer., Bull. U. S. Nat. Mus., 16, 1882 (1883), p. 871; San Pedro, Cal.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 32; vol. 4, 1900, pl. 4, fig. 15.

Galeus zyopterus JORDAN, Guide to Study of Fishes, vol. 1, 1905, p. 541, fig. 334.

Three specimens, field Nos. 09421, 09423, 09436, respectively, 36, 37.5, and 40.5 cm. long, from Pacasmayo, taken with hook and line from the pier and in the bay.

Following are the dimensions of the largest example:

	mm.
Total length	405
Distance from tip of snout to first gill-slit	72
Distance from tip of snout to eye	30
Diameter of eye	15
Length of spiracle	4
Interorbital	22
Depth of body	41
Distance from tip of snout to front of mouth	28
Distance between nostrils	15
Distance between angles of mouth	31
Distance from tip of snout to base of first dorsal	120

	mm.
Base of first dorsal	31
Length of anterior margin of first dorsal	31
Distance from origin of first dorsal to origin of second dorsal	118
Length of anterior margin of second dorsal	17
Distance from origin of second dorsal to base of caudal	60
Length of upper caudal lobe	91
Distance from tip of snout to base of pectorals	82
Length of anterior margin of pectorals	54
Breadth of distal margin of pectorals	40
Distance from base of pectorals to base of ventrals	110
Distance from base of ventrals to base of anal	62
Base of anal	18
Distance from insertion of anal to base of caudal	47
Distance from insertion of caudal to notch	56
Length of anterior margin of lower caudal lobe	42

Body slender; snout long, depressed; eye large; spiracle moderate; each tooth with a strong, sharp cusp directed backward, below and behind this are 1 to 4 smaller cusps or serrations, those at symphysis of jaw slightly smaller, several of the teeth tricuspid as in *Triakis;* mouth rounded at tip; nostrils nearer mouth than tip of snout. Fins small; second dorsal much smaller than the first, caudal long, 4.45 in total length; anterior part of lower caudal lobe elongate; anal smaller than second dorsal; ventrals small; pectoral elongate.

Color in alcohol, back and sides, dorsals and upper surface of pectorals, blackish, belly grayish silvery.

These individuals from Peru agree very well with the type of this species with which we have compared them.

Family SQUATINIDAE.

THE ANGEL SHARKS.

Genus SQUATINA Duméril.

9. SQUATINA SQUATINA (Linnaeus).

ANGELOTA.

Squalus squatina Linnaeus, Syst. Nat., ed. 10, 1758, p. 233; Coast of Europe.

Squatina californica Ayres, Proc. California Acad. Sci., 1859, p. 29; San Francisco.

Rhina squatina Günther, Cat. Fish. Brit. Mus., vol. 8, 1870, p. 430.

Squatina squatina Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1896, p. 58.

One specimen, a male, field No. 09517, 56 cm. long, from Lobos de Tierra.

Following are the measurements of this specimen:

	mm.
Total length	560
Tip of snout to base of pectoral	126
Tip of snout to origin of ventrals	212

	mm.
Tip of snout to origin of first dorsal	370
Origin of first dorsal to origin of second dorsal	61
Origin of second dorsal to tip upper caudal lobe	125
Snout	35
Distance between eyes	54
Space between spiracles	49
Tip of snout to anus	265
Total length, outer border of pectoral	175
Distance between angles of mouth	82
Width of free portion of caudal	90
Base of first dorsal	26
Height of first dorsal	53
Base of second dorsal	23
Height of second dorsal	46
Diameter of eye	10

Body compressed; snout rounded; eyes small, inserted near margin of disk; pectorals broad, distal margin truncate; ventrals narrower, truncate; dorsals small, narrow at base, rather high, of about equal size; caudal triangular, the lower lobe the longer; skin rough; enlarged prickles along the median line of the back; small patches in front of and behind the eyes, and two small patches on tip of snout on either side of median line of head; a single enlarged prickle, at a distance equal to diameter of eye from spiracle toward median line of head.

Color in alcohol, ashy gray, finely mottled and blotched with olive; dusky areas on dorsal and caudal, larger and irregular in form; ventral surface white.

Genus RHINOBATUS Bloch and Schneider.

10. RHINOBATUS PLANICEPS Garman.

GUIATARRA.

Plate 2, fig. 3.

Rhinobatus planiceps Garman, Bull. Mus. Comp. Zool., 1880, p. 168; Peru; Galapagos; Proc. U. S. Nat. Mus., vol. 3, 1880, p. 520; Paita, Callao, and Galapagos Islands.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 64.

One specimen, field No. 09508, 76.3 cm. long, and five specimens, field No. 09535, 19 to 21 cm. long, from Lobos de Tierra.

Dimensions of largest individual:

	mm.
Total length	763
Width of disk	267
Distance from tip of snout to end of ventrals	408
Distance from tip of snout to end of vent	315
Distance from tip of snout to end of mouth	120
Distance from tip of snout to end of nostrils	98
Distance from tip of snout to end of eye	100

	mm.
Distance from tip of snout to end of first dorsal	440
Base of first dorsal	39
Distance between dorsals	78
Base of second dorsal	43
Distance from second dorsal to base of caudal	42
Length of caudal	121
Width of interorbitals	40
Height of dorsals	75

Body rhombic, width of disk 1.52 in its length; head broad and flat; snout broad, its tip rounded; ridges of rostral cartilage close together, dilated at tip, spiracle immediately behind and smaller than eye, only a single fold on the posterior border, as well developed in the young as in the adult; mouth straight; anterior nasal valve single, not dilated; posterior two-lobed; an irregular row of rather stout spines on median line of back from occiput to first dorsal, several spines between dorsals; the rows of spines on ridges of rostral cartilage, over eyes and on median line of caudal peduncle, absent or greately reduced, approximating the prickles in size and appearance; two small patches of spines on shoulder. Dorsals triangular; anterior borders of pectorals straight, outer lobe rounded, hinder edge reaching to opposite middle of vent; outer angle of ventrals rounded, tip acute.

Color, brownish olive on back, slaty white on belly; several large indistinct dark brown areas, symmetrically arranged on either side of median line of back.

Color in life, light olive green with numerous dark blotches symmetrically placed, but of vague outline. First and second dorsal, caudal and outer parts of ventrals and pectorals with the least tinge of rufous; ventral surface white, except outer border of pectorals and in lesser degree the outer border of the ventrals.

Regarding the embryos, Mr. Coker states that they were taken from a "Guiatarra," 98 cm. in length. Eight in all were taken from this fish.

Family RAJIDAE.

THE SKATES

KEY TO GENERA REPRESENTED.

a^1. Disk rhombic; pectoral fins not extending forward to the extremity of snout ——— *Raja*, p. 13.

a^2. Disk circular; snout short and overlapped by the anterior portions of the pectoral fins which form the foremost part of the disk ——— *Psammobatis*, p. 16.

Genus RAJA (Artedi) Linnaeus.

KEY TO SPECIES REPRESENTED.

a^1. Distance from tip of snout to line connecting tips of pectorals 2 in breadth of disk; enlarged spines along median dorsal line of tail 25 to 30; dorsal surface of tail covered with stout prickles; rostral angle 52 degrees. *aguja*, p. 14.

a^3. Distance from tip of snout to line connecting tips of pectorals about 2.3 in breadth of disk; enlarged spines along median dorsal line of tail 10 to 12; rest of tail smooth; rostral angle 54 degrees.....*steindachneri*, p. 14.

11. RAJA AGUJA Kendall and Radcliffe.

Raja aguja KENDALL and RADCLIFFE, Mem. Mus. Comp. Zool., vol. 35, No. 3, p. 78, pl. 1, fig. 1–2, April, 1912; *Albatross* station 4653, near Point Aguja, Peru.

12. RAJA STEINDACHNERI Delfin.

PLATILLO; RAYA.

Raja chilensis STEINDACHNER, Fauna Chilensis, 1898, p. 332, pl. 31, fig. 15; Iquique (not *R. chilensis* Gay, Hist. Chile, Zool., vol. 2, 1848, p. 367).—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 328.

Raja steindachneri DELFIN, Cat. Peces de Chile, 1901, p. 23.

Raja burgeri DELFIN, Rayas Nuevas Chilenas, Rev. Chil. Hist. Nat., Ano VI, 1902, p. 267, pl. 12; Coquimbo.

The collection contains two specimens of this species, a female (field No. 09704) from Mollendo, and a male (field No. 09721) from Chimbote, where it was called "Raya."

Following are the measurements of these two specimens:

	Female.	Male.
	mm.	*mm.*
Total length	390	393
Length of disk	235	235
Width of disk	280	295
Tip of snout to front of eye	52	51
Distance between eyes	31	30
Interorbital	25	24
Longitudinal diameter of eye	12	12
Length of spiracle aperture	14	13.5
Height of first dorsal	8	9
Base of first dorsal	17	17.5
Distance between first and second dorsal	6	5.5
Height of second dorsal	9.5	10
Base of second dorsal	26	26.5
Tip of snout to nostrils	39	37
Tip of snout to center of mouth	44	43
Tip of snout to anus	211	203
Tip of snout to fifth branchial aperture	130	130
Breadth of mouth	39	41
Length of tail	162	178
Breadth of tail at its base	67	84
Length of clasper in male	.....	118

In the female there is a broad band of minute prickles barely protruding through the skin on the anterior dorsal border of the disk, beginning slightly in advance of eyes and extending backward to within two-sevenths distance from tip of snout to broadest part

of disk; another narrow band of closer set, slightly stronger prickles around spiracle behind eyes; concave interorbital space with scattered prickles; a narrow patch beginning opposite the first branchial aperture and extending along the border of the disk to the tip of snout; in all the patches the prickles are recurved so that they feel smooth if the finger is passed backward; a short stout spine before and another behind eye on interorbital ridge; a short row of similar spines on median line of back behind spiracle; a patch of similar spines in center of posterior projecting lobe of pectoral; a row of 10 stout triangular spines on median line of tail in front of dorsal; a single stout spine between dorsals and a row of prickles on median line of back; a continuation of spines on tail.

Disk opposite eyes, convex, then becoming slightly concave; posterior border rounded; pectoral rays about 70.

Color, in alcohol, back brownish, becoming olive-gray on the margins of the disk; ventral surface grayish white.

In the male the prickles are stronger; on the median line of the back anteriorly there is a single enlarged spine surrounded by an elongate patch of prickles; there are 12 stout spines on median line of tail in front of dorsal, 1 between dorsals; in front of spines on tail there is a patch of prickles extending along median line of back; no group of spines on posterior lobe of pectoral; opposite broadest part of disk and nearly parallel with it near the margin there is a double row of stout recurved spines, 16 spines in each row; on the right side there are several spines forming a third row; pectoral rays about 70.

Color in alcohol, back brown, with olive spots about size of eyes tending to form rows parallel with median line of back; the brown fading out to olive-gray on borders of disk; ventral surface grayish-white.

The more pointed snout, the stout spines near pectoral border, and absence of group on posterior lobe, the difference in coloration, and the elongate claspers reaching beyond origin of first dorsal serve to distinguish the two. A greater difference lies in the remarkable character of the teeth. In the female they are pavementlike, with only a very slight raised area in center of tooth; in the male they are strong, recurved, conical teeth, and the mouth is more arched. Doctor Steindachner does not indicate a spine between dorsals and no patch of spines on posterior lobe of pectoral; in other respects our examples agree with the specimen described and figured by him. Delfin's statement in his description of *R. burgeri* that there are about 52 pectoral rays is undoubtedly a mistake, for if the short anterior rays are counted, there are about 70 rays.

Genus PSAMMOBATIS Günther.

13. PSAMMOBATIS BREVICAUDATUS Cope.

Psammobatis brevicaudatus COPE, Proc. Amer. Philos. Soc., 1877, p. 48; Pascasmayo Bay, Peru.—ABBOTT, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 328.

Genus DISCOPYGE Tschudi.

14. DISCOPYGE TSCHUDII Heckel.

Discopyge tschudii HECKEL in Tschudi, Fauna Peruana, Pisc., 1845, p. 33, pl. 6; Heradura between Huacho and Chancay.—DUMÉRIL, Ichth., vol. 1, 1865, p. 521.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 8, 1870, p. 454.—STEINDACHNER, Fauna Chilensis, 1898, p. 332, pl. 21, figs. 14*a*, 14*b*.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 329.

Genus PTEROPLATEA Müller and Henle.

15. PTEROPLATEA CREBRIPUNCTATA Peters.

TUYO.

Pteroplatea crebripunctata PETERS, Monatsber. Berlin Akad. Wiss., 1869, p. 703; Mazatlan.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 87.—GILBERT and STARKS, Fishes of Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 18.

One specimen, a male, field No. 09507, 35 cm. in length, from Lobos de Afuera.

Disk nearly twice as broad as long; distance from tip of snout to hinder margin of pectorals 1.74 in breadth of disk; snout sharp, rostral angle about 115 degrees; distance from tip of snout to eye 8.60 in breadth of disk; eye small, 4.83 in snout; distance between eyes 1.38 in snout; tip of snout to center of mouth 9.26 in breadth of disk; tip of snout to anterior gill opening 5.53.

Color in life, disk mingled olive green and olive brown, finely marked with darker and lighter and conspicuously speckled with small white spots, these spots smaller than eye, each surrounded by a ring of darker. The spots in this specimen are separted by a distance of one-half inch to 2 inches, generally about 1 inch. Posterior border of disk above of a dark reddish color (specimen out of water some time). Below, the posterior border is of the same color; outer half or more of each wing, rusty orange.

Compared with specimens in the United States National Museum, the disk is dark olive in alcohol instead of a reddish brown.

Genus MYLIOBATIS Duméril.

16. MYLIOBATIS CALIFORNICUS Gill.

RAYO.

Rhinoptera vespertilio Girard, Proc. Acad. Nat. Sci. Phila., 1856, p. 137; Tomales Bay; not *Myliobatis vespertilio* Bleeker, also a *Myliobatis*.
Holorhinus vespertilio Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 331.
Myliobatis californicus Gill, Ann. Lyc. Nat. Hist., New York, 1865, p. 137, (after Girard).—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 89.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p.. 331.

One specimen, field No. 09120, 58 cm. in length from Callao, and one, field No. 09540, 71.5 cm. in length from Paita, bought from fishermen.

Dimensions of the Paita specimen:

	mm.
Length of disk to front of anus	215
Length of disk to posterior edge of pectorals	250
Width of disk	445
Length of tail	465
Snout	46
Diameter of eye	13
Interorbital (bone)	41
Tip of snout to middle of nasal flap	41
Tip of snout to anterior gill openings	83
Distance between anterior gill openings	75
Distance between posterior gill openings	45
Length of spiracle	26
Breadth of distal border of ventrals	55
Length of fontanel	57
Greatest width (at anterior end)	25

Disk not quite twice as broad as long, pectorals slightly convex anteriorly and slightly concave posteriorly; distal border of ventrals broad and rounded, much broader than in *M. asperrimus;* head broad and depressed, snout rather short, shorter than in *M. asperrimus;* lateral teeth in 3 to 5 series, median teeth between 4 and 5 times as broad as long; skin smooth.

Color in alcohol: Dusky brown, a light line originating under middle of spiracle, extending backward along base of pectorals, from this 10 or more transverse lines extending across pectorals, these narrow of bands or lines have well-defined edges but differ so little in coloration from the ground color as to be easily overlooked; ventral surface light.

Genus CALLORHYNCHUS Gronow.

17. CALLORHYNCHUS CALLORHYNCHUS (Linnaeus).

PEJE-GALLO.

Chimaera callorhynchus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 402.

Chimaera antarctica Lacépède, Hist. Nat. Poiss., vol. 1, 1799, p. 400, pl. 12, fig. 2.

Callorhynchus antarcticus Gay, Hist. Chile. Zool., vol. 2, 1848, p. 358.—Günther, Cat. Fish. Brit. Mus., vol. 8, 1870, p. 351.—Steindachner, Fauna Chilensis, 1898, p. 331.—Smitt, Poiss. Exped. Scient. Terr. Feu, Svenska Exped. Till. Magellanslanderna, Havell, vol. 24, No. 5, 1898 (1899), p. 128, pl. 11.

Callorhynchus callorhynchus Delfin, Cat. Peces de Chile, 1901, p. 27.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, p. 764; Callao, Peru.

One specimen, field No. 09105, 61 cm. in length, from La Ventanilla, between Ancon and Callao, taken with a gillnet, fishing in the surf.

Following are the dimensions of this individual:

	mm.
Total length, including cartilaginous appendage	610
Total length, not including appendage	580
Length (exclusive of appendage) to origin of lower caudal lobe	410
Length of head (exclusive of appendage)	100
Diameter of eye	17
Interorbital	38
Width of head	55
Tip of snout to origin of first dorsal	125
Tip of snout to origin of second dorsal	293
Distance from origin of first dorsal to origin of second dorsal	157
Length of base of first dorsal	61
Length of base of second dorsal	103
Length of base of anal	31
Length of first dorsal spine	129
Length of anterior border of second dorsal	68
Length of anterior border of anal	62
Length of pectorals	154
Length of ventrals	74
Depth of body	97
Length of caudal	176

Body compressed, caudal peduncle slender; head rather stout; dorsal spine long, with serrate edges; second dorsal elevated anteriorly; caudal ending in a long filament; anal long, pointed, inserted close to caudal; ventrals large; pectorals very large and broad, tips reaching vent.

Body silvery, with large round black spots; a V-shaped black area between eyes; a second in front of first dorsal; a black spot below first dorsal; space between dorsals crossed by three black saddles, interrupted by median line of back; 2 black areas below second

dorsal; dorsal surface of caudal peduncle black; a row of about 6 black spots along lateral line; a second row below lateral line; a black area above base of ventrals; vertical fins dusky, darkest at tips; paired fins blackish.

Family CLUPEIDAE.

THE HERRINGS.

KEY TO GENERA REPRESENTED.

a.[1] Vertebrae about 50 in number (46 to 56); species of northern or southern regions.

b[1]. Vomer with teeth; ventral scutes weak, ventrals below middle of dorsal; vertebrae 50 to 56; skeleton rather firm.

c[1]. Origin of dorsal well in advance of the middle of body. *Potamalosa*, p. 19.

b.[2] Vomer without teeth; ventral scutes very weak, the belly more or less rounded; vertebrae about 52; ventrals under middle of dorsal. Skeleton weak; flesh oily ..... *Sardinella*, p. 20.

a.[2] Vertebrae about 42 (40 to 44); tropical species with the scales large and usually firmly attached; ventrals inserted under middle of dorsal; adipose eyelid present ..... *Harengula*, p. 21.

Genus POTAMALOSA Ogilby.

18. POTAMALOSA NOTACANTHOIDES (Steindachner).

MACHETE.

Clupea (*Alosa*) *notacanthoides* Steindachner, Ichth. Notizen, No. 9, 1869, p. 20, pl. 7; Mazatlan.

Potamalosa notacanthoides Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 333.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 35, 1906, p. 778.

Clupea notachanthus Günther, Cat. Fish. Brit. Mus., vol. 7, 1868, p. 443.—Delfin, Cat. Peces de Chile, 1901, p. 39.

Five specimens, field No. 447, 12.6 to 14.3 cm. in length, and two specimens, field No. 263, 22.1 and 25.5 cm. in length, all from Callao.

Head 2.94 to 2.97 in length; depth 2.85 to 3.07; eye 4.12 to 4.85 in head; snout 4.85 to 5.07; maxillary 2.05 to 2.26; interorbital 4.46 to 4.85; pectoral 1.47 to 1.74; ventrals 2.35 to 2.76; dorsal scutes 23 to 25; ventral scutes 35 to 36; D. 20 or 21; A. 14–17.

In these specimens there are 13 or 14 divided rays in the anal, but in the smaller individuals a larger number of simple rays is discernible in front of the divided rays than in larger examples.

Body deep, compressed, curvature of ventral outline greater than that of the dorsal; head short, compressed; mouth large, oblique, jaws subequal; maxillary extending slightly beyond vertical from posterior border of eye; snout short, blunt.

Distal margin of dorsal concave, anterior rays longest, origin of dorsal in advance of middle of body; caudal forked nearly to base;

anal low, distal margin truncate, anterior rays longest; ventrals short, tips reaching over half distance from base to vent; tips of pectorals extending to within two-thirds diameter of eye to base of ventrals; scales striate and fimbriate; scutes on abdomen distinct, those in front of dorsal, weak; venules on cheek, opercle, and shoulder very distinct; opercle translucent.

Color in alcohol: Small examples blackish on back, silvery on sides and belly; scales everywhere glassy; a row of 4 to 11 small oblong black areas from upper edge of opercle along the side to below posterior base of dorsal; opercle dusky; caudal light with dusky marking; anal light, anterior rays tipped with dusky; pectorals and ventrals light.

In the larger individuals the sides below blackish, back yellowish, becoming silvery on the elongate scales above scutes of belly; row of black spots from opercle in lower part of dusky area scarcely discernible. In the largest individual there is a row of 8 black spots nearly as large as pupil from center of opercle along side to behind dorsal, below this row 3 other spots anteriorly; in the other example, these are very irregular in their arrangement; inner dark border to caudal lobes very distinct.

Genus SARDINELLA Cuvier and Valenciennes.

19. SARDINELLA SAGAX (Jenyns).

SARDINA.

Clupea sagax Jenyns, Zool. Voy. *Beagle*, Fishes, 1842, p. 134; Lima; San Lorenzo Islands.—Steindachner, Fauna Chilensis, 1898, p. 331.—Delfin, Cat. Peces de Chile, 1901, p. 39.

Alausa fimbriata Kner and Steindachner, Neue Fische, Mus. Godeff, Sitz. Akad. Wiss. Wein, 1866, p. 31 (386), fig. 15; Valparaiso.

Clupanodon fimbriata Abbott, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.

Clupanodon fimbriatus Abbott, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 334.

Clupanodon sagax Abbott, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 334.

Sardinella sagax Jordan, Guide to Study Fishes, vol. 2, 1905, p. 50, name only.

Sardinella fimbriata Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 778.

One specimen, field No. 446, 21 cm. in length, and two specimens, field No. 452, 17 and 19.6 cm. in length, from Callao; and 21 specimens, field No. 09448 (part), 2.8 to 5.3 cm. in length from Lobos de Afuera.

Head 3.27 in length; depth 4.35; eye 4 in head; snout 3.46; maxillary 2.36; pectoral 1.57; D. 18; A. 18.

Body elongate, subcylindrical; head elongate, compressed; snout short, rather blunt; eye large, adipose eyelid well developed; jaws subequal; mouth small, horizontal; maxillary reaching vertical from middle of eye; no teeth on jaws; gillrakers numerous, very slender and long, longer than eye, 3.5 in head, angle sharp; veining on cheeks and opercles very distinct, these extending backward onto shoulders.

Scales thin, deciduous, very weakly ctenoid; median line of belly armed with scutes, 20 anterior to ventrals, 15 between ventrals and anus; origin of dorsal two-thirds diameter of eye nearer tip of snout than base of caudal; dorsal triangular, middle rays shorter; caudal deeply forked; anal low; ventrals short, 3 in head, origin of ventrals slightly posterior to middle of dorsal; tip of pectoral extending to within one diameter of eye from origin of ventral.

Color, lustrous blue on back, becoming silvery yellow on belly; fins dusky.

Coast of Peru and Chile, New South Wales.

In Sherrin's Handbook of the Fishes of New Zealand (page 72, 1886) we find the following note on this species:

> This ——— herring ——— visits the east coast of Otago every year in February and March, and when the schools migrate, they extend as far as the eye can reach, followed by a multitude of gulls, mutton-birds, baracuda and porpoises. So densely packed are they some years that by dipping a pitcher in the sea, it would contain half fish, so that if large boats and suitable nets were employed thousands of tons could be caught.

Genus HARENGULA Cuvier and Valenciennes.

20. HARENGULA STOLIFERA (Jordan and Gilbert).

PELADA.

Clupea stolifera Jordan and Gilbert, Proc. U. S. Nat. Mus., vol. 4, 1881, p. 339; Mazatlan, Mexico.

Sardinella stolifera Jordan, Fishes of Sinaloa, Reprint, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 408, pl. 28.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 431; vol. 4, 1898, pl. 73, fig. 194.—Boulenger, Bull. Mus. Zool. Anat. Comp., Torino, vol. 14, 1899, p. 1.—Gilbert and Starks, Fishes of Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 39.

Two specimens, field No. 1030, 14 and 14.3 cm. long, from Capon.

Head 4.32 in length; depth 3.4; eye 2.9 to 3.1 in head; snout 3.66; maxillary 2.4; interorbital 4; P. 1.2; V. 1.85; D. 15–16; A. 19–22; scales 40–11; scutes 17+12=29. Body deep and strongly compressed, the ventral outline more strongly arched than the dorsal; greatest depth of body in front of dorsal; head short; lower jaw projecting, upper slightly emarginate; mouth small, oblique; no teeth on vomer or palatines, small patch on tongue; a few small weak teeth on each jaw; eye large, longer than snout, adipose eyelid well

developed; origin of dorsal slightly in advance of ventrals, nearer tip of snout than base of caudal by about two-thirds length of head; scales smooth, firm, their edges with weak serrations—these serrations inconspicuous in the young from the Bay of Concepcion, Lower California; dorsal, anal, and caudal, each with a narrow sheath of scales; ventral scutes well developed.

Ground color in spirits, greenish, scales dusky edged: trace of a dark median line on back; a broad well-defined silver band alongside on level of eye extending from opercle to base of caudal, margined above with blue, narrowing on caudal peduncle and suddenly widening at bast of caudal; belly with a yellowish wash: fins yellowish; caudal lobes tipped with black.

Jordan and Herre in a Review of the Herring-like Fishes of Japan,[1] states as a character of the genus *Harengula* "adipose eyelid obsolete" and include in the synonymy of this genus *Lile* Jordan and Evermann[2] (*stolifera*). Our specimens and others from Concepcion Bay, Lower California, in the Reserve Series of the Bureau of Fisheries, identified as this species, have an adipose eyelid. It is translucent and lying against the silvery iris might easily be overlooked. The adipose eyelid is also present in specimens of *H. moluccensis* from Bulan, Philippine Islands. This genus is very close to *Sardinella*, differing mainly in having fewer vertebrae.

The number of dorsal and anal rays in this species is subject to considerable variability.

Family ENGRAULIDAE.

THE ANCHOVIES.

KEY TO GENERA REPRESENTED.

a^2. Vertebrae about 41 in number; bones firm; species chiefly tropical.
Stolephorus, p. 22.

a^2. Vertebrae about 45; bones feeble; species of the temperate zones.
Engraulis, p. 23.

Genus STOLEPHORUS Lacépède.

KEY TO PERUVIAN SPECIES.

a^1. D. 14; A. 23 or 24; depth of head at occiput equal to length of head.
tapirulus, p. 23.

a^2. D. 16 or 17; A. 26 or 27; depth of head at occiput 2 in length of head.
peruanus, p. 23.

[1] Proc. U. S. Nat. Mus., vol. 31, 1907, p. 633.
[2] Fish. North and Mid. Amer., vol. 1, 1896, p. 431.

21. STOLEPHORUS TAPIRULUS (Cope).

Engraulis tapirulus Cope, Proc. Amer. Philos. Soc., 1877, p. 45 (p. 29, separate) : Pacasmayo Bay.
Stolephorus tapirulus Abbott, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 335.

22. STOLEPHORUS PERUANUS (Steindachner).

Engraulis peruanus Steindachner. Ichth. Beitr., 1879, vol. 8, p. 60; Callao.
Stolephorus peruanus Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 335.

Genus ENGRAULIS Cuvier.

KEY TO SPECIES REPRESENTED.

a^1. Depth 5.8 to 6.5 in total length; eye 4.15 to 4.5 in head; snout 6.27 to 72 ..... *ringens*, p. 23.
a^2. Depth 5.25 in total length; eye 4 in head; snout 4 (in drawing). *nasus*, p. 24.

23. ENGRAULIS RINGENS Jenyns.

ANCHOBETA.

Plate 3, fig. 1.

Engraulis ringens, Jenyns, Zool. Voy. *Beagle*, 1842, p. 136; Callao.—Steindachner, Ichth. Beiträge, 1879, p. 62.—Günther, Cat. Fish. Brit. Mus., 1868, p. 386.—Steindachner, Fauna Chilensis, 1898, p. 331.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 336.

Six specimens, field No. 09163, 13.6 to 14 cm. in length, from Chimbote; four, field No. 09528, 11.6 to 13.8 cm. in length, from Lobos de Tierra; and 38, field No. 298, 3.6 to 4.8 cm. in length, from between Lobos de Tierra and Eten.

Doctor Coker states that between Lobos de Tierra and Eten he passed through many schools of "anchobeta." Among them small red spots in the water were conspicuous. These spots consisted of very small anchobetas.

Head 3.1 to 3.25 in length; depth 4.75 to 5.25; eye 4.15 to 4.5 in head; snout 6.27 to 7.2; maxillary 1.52 to 1.57; interorbital 5.8 to 6; pectoral 1.77 to 2; ventrals 2.88 to 3.25; D. i, 14 or 15; A. 19 or 20.

Body rounded above, slightly carinated below; snout short, pointed, strongly projecting beyond jaws; eyes large; teeth small; anterior rays of dorsal longest, 2 in head; insertion of dorsal nearer base of caudal by a distance varying from 0.75 to 1 diameter of eye; caudal forked; anterior anal rays longest, distal margin slightly concave; pectorals and ventrals short; scales large, deciduous; some individuals when dry show marked venules on opercle.

Color in alcohol, back bluish; sides silvery; traces of lateral band in some specimens.

24. ENGRAULIS NASUS Kner and Steindachner.

Engraulis nasus KNER and STEINDACHNER, Neue Fische Mus. Godeffroy, 1866, p. 388 (33), fig. 17; Chincha Islands, Peru.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 335.

The validity of this species is questionable. From the description it appears that the depth is somewhat greater, the eye larger, and the snout and maxillary longer, than in *E. ringens*.

Family LEPTOCEPHALIDAE.

THE CONGER EELS.

Genus LEPTOCEPHALUS (Gronow) Scopoli.

The following two species have been described from Peruvian waters:

25. LEPTOCEPHALUS MULTIMACULATUS Steindachner.

Leptocephalus multimaculatus STEINDACHNER, Ichth. Notizen, No. 9, 1869, p. 27; Peru.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.

26. LEPTOCEPHALUS PERUANUS Steindachner.

Leptocephalus peruanus STEINDACHNER, Ichth, Notizen, 1869, p. 28; Coast of Peru.—ABBOTT, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.

Genus OPHICHTHUS Thunberg and Ahl.

KEY TO SPECIES REPRESENTED.

a^1 Maxillary and mandibular teeth biserial in the adult.
  b^1. Gape of mouth about 2.5 in length of head; color olivaceous with large dark spots ..... *grandimaculatus*, p 24.
  b^2. Gape of mouth about 2.5 in length of head; color uniform brown, clear on belly ..... *callaensis*, p. 25.
a^2 Maxillary and mandibular teeth tri or quadriserial.
  Color dark brown above, yellowish olive below; a row of small white spots along lateral line anteriorly, similar spots on nape. *pacifici*, p. 25.

27. OPHICTHUS GRANDIMACULATUS (Kner and Steindachner).

ANGUILLA.

Ophichthys grandimaculatus KNER and STEINDACHNER, Neue Fische Mus. Godeffroy, Sitz. Akad. Wiss. Wien, vol. 20, 1866, p. 389, pl. 5, fig. 13; Coast of Peru.

Ophichthus grandimaculatus ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.

One specimen, field No. 09531, 38 cm. long, from Lobos de Tierra.

Trunk shorter than tail, 1.37 in length of latter; head 4 in trunk; eye 6.66 in head, shorter than snout which is 5.7 in head; gape of

mouth 1.6; P. 2.5; maxillary teeth pointed, biserial, recurved, fixed; vomerine teeth uniserial, the three anterior teeth stronger than the others.

Color in life, olivaceous with large dark spots; the spots on head small (about the size of eye or smaller) and set closely. In spirits, the ground color is a very light brown; a row of black spots along median line of back; some of these circular, crossing dorsal fin, equal on each side of median line; others hemispherical and appear only on one side of median line; others appear as if the two hemispheres of a circle had been partially crowded by one another until they fail to match, the amount of variation being very great; below these and alternating with them is a row of larger black circles, each of these tending to pair with its fellow on the opposite side and extending below lateral line, in some cases appearing like a broad vertical crossband on back; slightly below the plane of this series and alternating with the spots composing it is a third series, smaller than the second and similar in position to the first, not continuing beyond anterior half of tail but replaced on posterior half of tail by a series of spots on the ventral surface, crossing the anal, similar to the first row on median line of back; head dotted with small black circular areas, smaller than those on body; interspaces on dorsal between black areas, body color; anal blackish; pectoral body color with three blackish areas.

28. OPHICHTHUS CALLAENSIS (Günther).

Ophichthys callaensis GÜNTHER, Zweiter Ichth. Beitr. Exempl. Mus. Godeffroy, Heft 4, 1873, p. 92; Callao.

Ophichthus callaensis JORDAN and DAVIS, Apodal Fishes Amer. and Europe, Rep. U. S. Fish Com., 1888 (1892), p. 633.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 778.

29. OPHICHTHUS PACIFICI (Günther).

ANGUILLA.

Plate 3, fig. 2.

Ophichthys pacifici GÜNTHER, Cat. Biol. Brit. Mus., vol. 8, 1870, p. 76; Chile and Peru.

Ophichthys uniserialis COPE, Proc. Amer. Philos. Soc., 1877, p. 47; Pacasmayo.

Ophichthus pacifici ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.

Ophichthus uniserialis ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.

One specimen, field No. 09556, 68 cm. in length, from Paita, and one, field No. 09670, 28.6 cm. in length, from Callao.

Head 2.84 in body (measured from tip of snout to center of vent); depth 7.78; eye 1.8 in snout, 10.4 in head; snout 5.78 in head; gape

of jaws measured from tip of snout 2.5; space between eyes 1.5 times diameter of eye; body from tip of snout to center of vent 1.3 in tail; trunk 2.02 in tail; pectoral nearly as long as gape of jaws, 2.54 in head; tip of snout to insertion of dorsal 2.22 in body.

Teeth in lower jaw in two distinct series, sharp, pointed, fixed, inside of these an inner series of irregular small teeth not discernible without dissection except for one or two more strongly developed teeth: teeth in the upper jaw in two series: premaxillary and vomerine teeth in a single series, those on premaxillaries longest and sharply pointed.

Color in alcohol, dark brown above, below yellowish olive, the line of separation of the two colors quite distinct; a row of about 20 small round white spots, about one-fourth diameter of eye, arranged along lateral line, disappearing posteriorly; a number of similar spots on nape. Description of specimen 68 cm. in length from Paita.

In a small individual from Callao the head is 2.7 in body; body (including head) 1.46 in tail; trunk 2.33 in tail; eye 1.42 in snout, 8.96 in head; snout 6.32 in head; gape of jaws 3; pectoral 2.4; distance from tip of snout to insertion of dorsal 1.76 in body. Teeth in jaws biserial, those on premaxillary and vomer uniserial. Color in alcohol essentially as in the larger example: on the top of the head back of the eyes there is a trace of a narrow white line extending across top of head, zigzagging downward to level of gape of jaw.

These specimens agree as closely with Cope's description of *O. uniserialis* as with Günther's description of *O. pacifici*, and the two species appear to be one. In Günther's description of *pacifici*, he states the teeth on maxillary and mandible are triserial or quadriserial. In our larger example there are two rows of well-developed teeth in each jaw, with several straggling teeth of a third row in the lower jaw; appearing above the mucus and integument, dissection reveals an inner bony ridge from which the third row is developed, with small teeth on it; in the upper jaw there is a trace of a similar ridge.

Genus GYMNOTHORAX Bloch and Schneider.

30. GYMNOTHORAX WIENERI Sauvage.

MORENA; MORENA COLORADO.

Plate 3, fig. 3.

Gymnothorax wieneri Sauvage, Bull. Soc. Philom. Paris, 1883, p. 161, July 7; Chile or Peru.

Lycodontis wieneri Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 332.

Two specimens, field Nos. 09677 and 09471, respectively 40 and 81 cm. long, from Lobos de Afuera, and one, field No. 449, 64 cm. long, from Callao.

Head 3.36 to 4.3 in trunk: snout 4.32 to 5.1 in head; eye 3 to 3.57 in snout, 15.3 to 15.8 in head; gape of mouth 2.03 to 2.55 in head; branchial aperture greater than diameter of eye; nasal tube about two-thirds eye in height; tail equaling length of body; snout blunt; eye situated above center of gape of mouth; a row of well-developed, recurved, subequal, compressed teeth on jaws, about 40 on upper and 50 on lower; outside these there is a supplementary row (easily overlooked) close to base and usually opposite interspaces between larger teeth, these best developed on front of jaw; 3 longer, fanglike teeth on palatines, posterior to eye; 3 or 4 recurved fanglike teeth on front of vomer, followed by an interspace, then a row of 12 or more small subequal teeth; in our largest specimen the anterior teeth in this row are somewhat irregularly placed, tending to form two rows.

Color in alcohol, chocolate-brown, marbled with darker and lighter; belly lighter, marblings not so distinct. Color-pattern difficult to describe because of its great irregularity.

Color in life: Entire body and head, dirty brown, mottled.

These specimens agree in all essential characters with the description by Sauvage.

Family CHARACINIDAE.

THE CHARACINS.

KEY TO GENERA REPRESENTED.

a^1. Adipose fin present.

b^1. Maxillary completely toothed; intermaxillary with three series of notched or tricuspid teeth; nostrils close together; gill-membranes free from isthmus ..... *Brycon*, p. 27.

b^2. Maxillary not completely toothed ..... *Astyanax*, p. 27.

a^2. No adipose fin; maxillary without teeth ..... *Lebiasina*, p. 29.

Genus BRYCON Müller and Troschel.

31. BRYCON ATRICAUDATUS (Kner).

Chalceus atricaudatus KNER, Sitzgsber Akad. Wiss. München, 1863, p. 227.

Brycon atricaudatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 336.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 777; Paita and Eten, Peru.—EIGENMANN, Cat. Fresh-water Fish. Trop. and South Temp. America, 1910, p. 431.

Genus ASTYANAX Baird and Gerard.

32. ASTYANAX PERUANUS (Müller and Troschel).

ANCHO.

Tetragonopterus peruanus MÜLLER and TROSCHEL, Hor. Ichth., vol. 1, 1845, p. 28, pl. 8, fig. 1; Peru.—CUVIER and VALENCIENNES, His. Nat. Poiss., vol. 22, 1849, p. 115 (153).—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 775.

Tetragonopterus scabripinnis CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 22, 1849, p. 114; Rio Rimac, Lima.

Tetragonopterus peruvianus GÜNTHER, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 327.—STEINDACHNER, Herpet.-ichthyol. Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 55.

Tetragonopterus microphthalmus GÜNTHER, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 324; Peru and Guatemala; part.

Astyanax peruanus EIGENMANN, The Fresh-water Fish. Patagonia and an Exam. Archiplata-Archhelenis Theory, 1909, p. 266; name only.

Eight specimens, field No. 09425, 5.3 to 7 cm. in length, from Pacasmayo; fifteen, field No. 270, 2.2 to 6.9 cm. in length; two, field No. 269, 9.2, and 9.9 cm. in length; and one, field No. 262, 7.2 cm. in length, from Rimac River below Lima; four specimens, field No. 275, 9 to 9.8 cm. in length, from Lima market.

Head 3.6 to 4 in length; depth 2.5 to 3; eye 3.4 to 4 in head; snout 3.75 to 4; interocular 2.63 to 2.8; pectorals 1.2 to 1.25; ventrals 1.6 to 1.8; D. I, 9 or 10; A. II, 25 or 26; scales 6 or 7-35-6.

Body rather robust; ventral outline more deeply curved than dorsal outline; snout blunt, nape straight or slightly concave; maxillary reaching to vertical from about front of pupil; eye large; gill-rakers short and rather slender, 7+11.

Origin of dorsal midway between tip of snout and bass of caudal; height of dorsal 1.4 to 1.55 in head; caudal forked; origin of anal under posterior third of dorsal, its anterior rays longest, distal margin concave; pectorals and ventrals vary greatly and the distance between their insertion is variable, varying from 0.76 to 1.14 in head. Description based on specimens from the Rimac River below Lima and from the Lima market, 8.9 to 9.8 cm. in length.

Color in life of field No. 262 from the Rimac River, olivaceous above; silvery on sides and below; iridescent; a greenish silvery lateral band distinguishable posteriorly; anal and sides of belly (laterally) punctate with red; sides of body with olive; median basal part of caudal black; pectoral tinged reddish orange; a large violet spot on opercle; iris dusky with orange in antero-dorsal part.

Among the larger specimens were ripe females and males. The anal rays in the males are well armed with rows of small sharp spinules, giving them a somewhat thickened appearance; occasional spinules are found near the tips of the longer rays in the females. These specimens in the spawning condition were taken about November 6, 1907.

Specimens from Pacasmayo taken March 12, 1907, also have these spinules. These specimens were not in spawning condition.

In the Pacasmayo specimens the tips of the pectorals reach to the insertion of the ventrals, and in nearly all of these the ventrals reach to the origin of the anal. The average in individuals from the Rimac is slightly less.

Color in life of specimens from Pacasmayo, olivaceous silvery; ventrally in posterior half of body, light purplish; bright spot of same color on opercle just below level of lateral line, and of the size of the pupil; light greenish silvery band on side, almost disappearing under anterior dorsal; but the dorsal limit of the band may be traced forward, and in the extended path of the stripe anteriorly are two or more spots of the same color, the most anterior of which is just behind opercle; glassy gold spot back of and above eye; the gold not superficial but seen through transparent glassy tissue; scales below lateral line and, to some extent, those above, with minute olive spots or specks; sides of head with similar specks; on lower part of sides these specks are red; similar minute red and olive spots on anal and to some extent on caudal; fins more or less tinged with yellow; caudal blackish at base of fork, a green spot on sides just anterior to this.

Genus LEBIASINA Cuvier and Valenciennes.

33. LEBIASINA BIMACULATA Cuvier and Valenciennes.

CHORO-COQUE; LAS PENITAS.

Lebiasina bimaculata Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 19, 1846, p. 382, pl. 587.—Günther, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 286.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 772; Callao and Eten, Peru, and Santa Rosa, Ecuador.

Seven specimens, field No. 267, 7.8 to 13.9 cm. in length, and five specimens, No. 270, 5.2 to 7 cm. in length, from the Rimac River below Lima.

Four specimens, field, No. 457, 10.7 to 12.7 cm. in length, from Lima market; two, field No. 09430, 5.8 and 7 cm. in length, from Pacasmayo; and three, field No. 322, 9.3 to 10.3 cm. in length, from a "pozo" a little short of half-way between Amotape and Tumbes.

Head 3.42 to 3.88 in length; depth 3.35 to 3.6; eye 5 to 6.4 in head; snout 4 to 4.15; interorbital 3 to 3.22; D. 9 or 10; A. 11 or 12; scales 25 or 26.

Body robust, head short, evenly rounded; teeth tricuspid; fins evenly rounded, longest dorsal ray 1.68 to 2 in head; base of dorsal 3 to 3.27; longest anal ray 1.85 to 1.92; base of anal 2.1 to 2.4; pectoral 1.38 to 1.45; ventral 1.68 to 1.71; origin of dorsal slightly behind origin of ventrals.

Color in alcohol of Lima market specimens, back plumbeous, sides tinged with yellow, ventral surface yellow; scales on sides of body with yellow centers and dusky edges, these forming horizontal rows; a round black spot at base of caudal; a very indistinct trace of a black lateral band and a dark spot behind opercle. In the indi-

viduals from the Rimac River, three rows of golden spots, one on each scale, along the rows of scales, and in the smaller individuals the plumbeous lateral band is distinct.

Color in life of Pacasmayo specimens, olivaceous, white below; four rows of the large scales are marked with bright orange spots. (These are the third, fourth, fifth, and sixth longitudinal rows, counting from the back.) Pectoral, ventral, and anal tinted with reddish orange; caudal margined posteriorly with reddish; at middle of base of caudal is a spot of very dark green, almost black.

In the three specimens taken from a "pozo" between Amotape and Tumbes, the scales are lost, the fins broken and the body appears much shrunken, giving these individuals quite a different appearance. The black caudal spot is quite distinct and the fin counts are the same.

The "pozo," where these fish occurred in abundance, is a small spring, the outlet of which flows but a short distance before it dries up and disappears. It corresponds closely to the "cenote" of Mexico.

Family SILURIDAE.

THE CATFISHES.

KEY TO GENERA.

a^1. Nostrils close together, neither with a barbel, the posterior with a valve; teeth on the palate; caudal forked. (Species chiefly marine.) Lower jaw with 4 barbels; palatine teeth fixed; both jaws with teeth. Gillrakers few, 5 to 25; eyes above level of mouth ..... *Galeichthys* (p. 30), including *Tachysurus*, p. 32.

a^2. Nostrils remote from each other. (Freshwater species.) Posterior nostril without barbel; barbels, 6; adipose fin well developed; teeth in villiform bands. Teeth on vomer none, or in small patches. Head covered with soft skin above, not granulated. Snout broad, scarcely produced; barbels terete or slightly flattened, not margined; head longer than broad.

b^1. Occipital process, if present, not reaching the dorsal plate; dorsal spine pungent ..... *Rhamdia*, p. 33.

b^2. Occipital process narrow, reaching the dorsal plate; fontanel reaching base of occipital process, a bridge across it above posterior margin of eye; humeral process spine-like ..... *Pimelodella*, p. 33.

Genus GALEICHTHYS Cuvier and Valenciennes.

KEY TO SPECIES.

a^1. Head and occiput entirely covered by flesh and skin; occipital process sparingly granulated ..... *peruvianus*, p. 31.

a^2. Occipital process and bones of head exposed or covered with very thin skin; bones on top of head and occipital process granular; palatine teeth in large ovate patches ..... *simonsi*, p. 31.

34. GALEICHTHYS PERUVIANUS Lütken.

BAGRE.

Plate 4, fig. 1.

Galeichthys peruvianus LÜTKEN, Ichth. Vidensk. Meddel., 1874, p. 205; Callao.—STEINDACHNER, Ichth. Beitr., vol. 4, (LXXII), 1875, p. 34.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 122.

Tachisurus peruvianus EIGENMANN and EIGENMANN, Nematognathi, 1890, p. 51.

Two specimens, field Nos. 09116 and 09118, respectively 37.5 and 36 cm. in length, from La Ventanilla, between Ancon and Callao, obtained while fishing in the surf with a gillnet.

Head 3.28 in length; depth about 5; eye 7 in head, 4 in interocular; snout 3.1 to 3.2; width of head 1.45; D. I., 7; A. 14.

Body elongate, tapering, caudal peduncle slender, its least depth 4 in head; head rounded, not much depressed; interorbital rounded; snout broad, rather bluntly rounded; top of head smooth, with traces of a few small granulations; fontanel rather deep, barely reaching anteriorly to above posterior margin of eye; top and sides of head with traces of reticulating mucous canals; maxillary barbel not reaching to base of pectoral; mental barbels not reaching gill-opening; post-mental barbels reaching to or beyond gill-opening (barbels quite variable in length). A broad band of villiform teeth on maxillaries; two small patches of villiform teeth on vomer; patches on palatines wider anteriorly, tapering to a point posteriorly; distance from insertion of dorsal to tip of snout 2.66 in length; serrations on front of dorsal spine weak, the spine 1.8 in head; distance from insertion of dorsal to adipose fin 2.75 in length; caudal deeply forked; ventrals small, 2.04 in head; pectorals 1.55.

Color in alcohol, back and sides bluish black; lower parts white; a rufous band as wide as eye along the lateral line; fins blackish.

35. GALEICHTHYS SIMONSI Starks.

BAGRE.

Galeichthys simonsi STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol 30, 1906, p. 764, figs. 1–2; Callao.

One specimen, field No. 1011, 31.5 cm. in length, from Tumbes, and seven small specimens, field No. 1032, 5.5 to 7 cm. in length, from Capon. These were observed in large numbers near the beach at Coleta Noel (Capon).

These specimens seem to belong to this species, although the differences separating them from *G. jordani* appear to be very slight.

Head 3.31 in length; depth 4.75; eye 6.15 in head, 2.3 in snout, 3 in interorbital; snout 2.66 in head; width between angles of

mouth 2.35; width of head 1.33; depth of head 1.73; D., 1.6; A., 18, including rudiments. Upper profile of head nearly straight; interorbital broad and flat; snout blunt, rather truncate; granular area on top of head similar in outline to that in *G. jordani*, the diverging points extending anteriorly to above anterior margin of pupil; fontanel groove reaching nearly to occipital process, slightly narrower in its posterior half than anteriorly, in this respect differing from the type; slightly constricted at the center where it enters the granular area; palatine teeth in large ovate patches; the vomerine patches meeting at the median line; maxillary barbel reaching base of pectoral, the postmental barbels to edges of gill opening and ventral barbels about three-fifths of distance from their base to gill opening; humeral spine concave on its upper surface, sharp pointed. (Dorsal and pectoral spine broken); longest dorsal rays 1.6 in head; base of adipose dorsal 4; caudal deeply forked; anterior anal rays longest, 2.16; middle rays of ventral longest, 1.6, upper surface of inner rays provided with a much thicker fold of integument, tips of ventrals reaching past insertion of anal; pectoral as long as ventrals.

Color of back and sides above lateral line, bluish black; lower parts silvery white; top of head similar in color to body; on sides below eye, this color abruptly white, the line of demarcation less distinct on opercles; a large black spot behind gill opening covering humeral spine; base of dorsal spine black, rest of fin pale; adipose fin light distally; anal dark, margined with lighter, a small dark area at base of ventrals.

Genus TACHYSURUS Lacépède.

36. TACHYSURUS EQUATORIALIS Starks.

BAGRE.

Tachysurus equatorialis Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 766, figs. 3 and 4; Guayaquil, Ecuador.

Two specimens, field No. 09568, 17 and 18.6 cm. in length, from Paita.

Head 3.85 in length; depth 5.7; eye 5 in head; snout 2.66; width between angles of mouth 2.66; interorbital 2.11; longest dorsal ray 1.29; longest anal ray 2.25; pectoral 1.54; ventral 1.6; caudal lobe 1; depth of caudal peduncle 3.1; D. I, 6; A., 23.

Upper anterior profile appearing perfectly straight and rather steeply sloping from dorsal spine nearly to tip of snout, where it curves very slightly downward; head as viewed from side, sharply wedge-shaped; top of head very finely granular, the granulated area ending some distance behind eyes, but continued forward to a point on each side, as a slightly rugose surface covered by thin skin, to

opposite posterior margin of the eye. The fontanelle groove fails to reach the occipital process by a distance equal to vertical diameter of eye, its widest and deepest part where it transverses the granulated area on top of head, where for a distance equal to the long diameter of eye it is sharply defined, and as wide and deep as base of slender maxillary barbel; posteriorly it ends in a point; anteriorly it is continued as a faint line with indefinite gently rounded edges to in front of the eyes, where it abruptly becomes wider, deeper, and sharply defined for a short distance and ends opposite the posterior nostril. (Starks.)

Dorsal high; caudal deeply forked; anterior anal rays longest; distal margin slightly concave; ventrals small; pectorals rather elongate, tips reaching nearly to vertical from posterior base of dorsal.

Color in alcohol: Dorsal surface bluish black with a tinge of brown on sides; ventral surface whitish, the region below lateral line dotted with brown; fins dusky; barbels bluish black.

These specimens agree closely with Starks's original description of the type.

Genus RHAMDIA Bleeker.

37. RHAMDIA GILLI Starks.

Rhamdia gilli Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 769, pl. 65, fig. 1; Rio Eten, Eten, Peru.

The type and one cotype were taken at Eten, Peru, in the Rio Eten.

Genus PIMELODELLA Eigenmann and Eigenmann.

38. PIMELODELLA YUNCENSIS Steindachner.

Pimelodella yuncensis Steindachner, Herpet-ichthyol. Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 47; Pacasmayo, Peru.

Genus PYGIDIUM Meyen.

KEY TO PERUVIAN SPECIES.

a^1. Dorsal placed partly over the anal; caudal truncate or rounded.
  b^1. First ray of the pectoral prolonged except in very young.
    c^1. Teeth in broad bands in both jaws.
      d^1. Head 6.5 to 7 in total length; coarse brown confluent blotches, few above anteriorly; forming two series posteriorly with pale band between ..... *pocyanum*, p. 34.
      d^2. Head about 5 in length (5.33 to 6.6 in total); ground color reddish brown with lighter spots and vermiculations ..... *rivulatum*, p. 34.
    c^2. Teeth in two series in each jaw (?).
      e^1. Head narrowed forward, heart-shaped, scarcely wider than long; upper maxillary barbels reaching to base of pectoral; origin of anal below end of dorsal; a dark lateral band, two series of spots above it; top of head spotted. Head 7; D. 8; A. 6. (Kner and Steindachner.) ..... *tacnia*, p. 35.

c^2. Head of uniform width; width of mouth more than half length of head. Teeth in the anterior series of each jaw compressed. Maxillary barbels reaching beyond base of pectoral. Head and body with numerous dark spots. Head 7; D. 9; A. 7. (Kner and Steindachner.) ..... *laticeps*, p. 35.

b^2. First ray of pectoral not prolonged; none of the barbels reaching gill-opening.

c^1. *Dorsal* 11 or 12; A. 9 or 10 ..... *oroyae*, p. 35.

c^2. D. 8; A. 6 or 7 ..... *quechuorum*, p. 36.

a^2. Dorsal entirely in front of the anal; caudal emarginate.

b^1. Dorsal behind the base of the ventrals; head longer than broad by a diameter of the eye.

c^2. Spots as large as or larger than the eye ..... *dispar*, p. 35.

c^1. Spots much smaller than the eye ..... *punctulatum*, p. 35.

b^2. Dorsal partly over the base of the ventrals; D. 8; A. 12 ..... *pardum*, p. 36.

39. PYGIDIUM POEYANUM (Cope).

Trichomycterus rivulatus Cope, Proc. Acad. Nat. Sci. Phila., 1874, p. 132; Arequipa, Peru; not of Cuvier and Valenciennes.

Trichomycterus poeyanus Cope, Proc. Amer. Philos. Soc., 1877, p. 47; Arequipa, Peru; based on specimens in previous reference.

Pygidium poeyanum Eigenmann and Eigenmann, Nematognathi, 1890, p. 326.

40. PYGIDIUM RIVULATUM (Cuvier and Valenciennes).

Trichomycterus rivulatus Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 495; Guasacona.—Günther, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 274 (copied).—Cope, Proc. Amer. Philos. Soc., vol. 17, 1877, p. 47; Lake Titicaca.

Pygidium rivulatum Eigenmann and Eigenmann, Proc. Cal. Acad. Sci., ser. 2, vol. 2, 1899, p. 51; Cuzco; Moho and Puno on Lake Titicaca.—Eigenmann and Eigenmann, Nematognathi, 1890, p. 330.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 771.

?Trichomycterus incae Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 496; Rio Guatanai at Cuzco.

Trichomycterus gracilis Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846; Rio Azangaro near Guasacona; Rio Guatanni near Cuzco; Rio Pontezualo near Coroico; Lake Compucila near Cuzco.—Cope, Proc. Amer. Philos. Soc., vol. 17, 1877, p. 681; Tinta.

Trichomycterus barbatula Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 498; Guasacona; Rio Pontezualo near Coroico.

Trichomycterus pentlandi Castelnau, Anim. Nouv. Amerique Sud, 1855, p. 49, pl. 24, fig. 1; Lake communicating with the Ucayale.

Trichomycterus pictus Castelnau, Anim. Nouv. Amerique Sud, 1855, p. 59, pl. 24, fig. 2; Lake Titicaca.

Trichomycterus dispar Günther, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 273 (part); Lake Titicaca; Rio de Pontezualo; Andes de la Paz; Guasacona, Rio de Azangaro.—Garman, Bull. Mus. Comp. Zool., vol. 3, 1875, p. 275; Lake Titicaca.

Habitat: Lake Titicaca; Ucayale and its tributaries.

41. PYGIDIUM TAENIA (Kner).

Trichomycterus taenia KNER, "Sitzgsber. Akad. Wiss. München, 1863, p. 228."—KNER and STEINDACHNER, Abh. Bayer. Akad. Wiss., 1864, p. 52, pl. 6, fig. 1; Western Slope Peruvian Andes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 274.

Pygidium taenia EIGENMANN and EIGENMANN, Nematognathi, 1890, p. 333.

42. PYGIDIUM LATICEPS (Kner).

Trichomycterus laticeps KNER, Sitzgsber. Akad. Wiss. München, 1863, p. 228.—KNER and STEINDACHNER, Abh. Bayer. Akad. Wiss., 1864, p. 54, pl. 6, fig. 2 and fig. 1*a*; Western Slope of Peruvian Andes.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 274.

Pygidium laticeps EIGENMANN and EIGENMANN, Nematognathi, 1890, p. 334.

43. PYGIDIUM OROYAE Eigenmann and Eigenmann.

BAGRE-CITO.

Plate 4, fig. 2.

Pygidium oroyae EIGENMANN and EIGENMANN, Proc. Cal. Acad. Sci., ser. 2, vol. 2, 1889, p. 51; Oroya; Nematognathi, 1890, p. 334.

Two specimens, field No. 564, 12.7 and 13 cm. in length, from river at Oroya.

Body compressed; caudal peduncle strongly compressed, its least depth 1.31 in head; head broad, depressed, its length equal to its breadth, 5.2 in length; depth of body 5.73; eyes very small, 10.5 in head, 3.5 in interocular space; snout 2.1 in head; interocular 3; barbels short and rather stout, none of them reaching gill-opening. D. 11; A. 9; insertion of dorsal over vent; insertion of anal under middle of dorsal; caudal broad and rounded; ventrals small, close to vent, 2.21 in head; pectoral broad, fan-shaped, 1.23; opercular and subopercular spines well developed.

Color in alcohol: Yellowish, with irregular groups of dark brown spots.

44. PYGIDIUM DISPAR Tschudi.

Pygidium dispar TSCHUDI, Fauna Peruana, Ichthyol., 1845, p. 22, pl. 3; eastern slope of the Peruvian Andes, at an altitude of 14,000 feet.—EIGENMANN and EIGENMANN, Nematognathi, 1890, p. 335.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, p. 770, 1906.

45. PYGIDIUM PUNCTULATUM (Cuvier and Valenciennes).

BAGRE.

Trichomycterus punctulatus CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 18, 1846, p. 362 (488); pl. 552; river at Lima.

Pygidium dispar punctulatum EIGENMANN and EIGENMANN, Nematognathi, 1890, p. 336.

Pygidium punctulatum Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, p. 771, 1906.

Pygidium dispar Tschudi var. *punctulatum* Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 49; Rio Chillon, near Lima.

Two specimens, field No. 265, 14 and 15.4 cm. in length; nine specimens, field No. 213, 5.4 to 9.4 cm. in length, from the Rimac River below Lima; and one specimen, field No. 426, 22.8 cm. in length, from the Rimac near Lima.

Head 5.12 in length; depth 6.5; eye 10 in head, 3 in interocular space; snout 1.3 in head; interocular space 3.16; D. 12, only seven of which are branched, only two of the simple rays discernible without dissection; A. 9, only five of which are branched, and only one of the simple rays discernible without dissection. Body robust, much compressed posteriorly, least depth of caudal peduncle 1.73 in head; head depressed, its breadth 1.22 in its length; distance from tip of snout to insertion of dorsal 1.6 in length; insertion of dorsal slightly posterior to base of ventrals; distance from tip of snout to insertion of anal 1.35 in length, insertion of anal in vertical from posterior base of dorsal; ventrals short, barely reaching vent, 1.90 in head; upper pectoral ray produced into a long filament, length of fin without filament, 1.58 in head.

Color in alcohol: Lavender; body covered with rather large, round, brownish black spots, those on top of head and base of caudal smaller and more numerous. Description based on a specimen 22.8 cm. long.

The validity of this species seems questionable, as it appears to differ from *P. dispar* in little but color, and the variability of coloration in our examples seems to indicate that this character has little value. In the two larger specimens in our collection many of the spots on the sides of the body are as large as or larger than the eye; in the smaller specimens the size of the spots is variable, in some they are mere points thickly sprinkled over the entire body and in others considerably larger and in correspondingly smaller numbers.

46. PYGIDIUM PARDUM (Cope).

Trichomycterus pardus Cope, Proc. Acad. Nat. Sci. Phila., 1874, p. 132; Proc. Amer. Philos. Soc., 1877, p. 45; Jequetepeque; Callao Bay.

Pygidium pardum Eigenmann and Eigenmann, Nematognathi, 1890, p. 337.

47. PYGIDIUM QUECHUORUM Steindachner.

Pygidium quechuorum Steindachner, Herpt.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 49, pl. 4, fig. 3, 3*a*; Rio Chile, near Arequipa, Peru.

Family LORICARIIDAE.

KEY TO PERUVIAN GENERA.

a^1. Dorsal fin, I, 7 to 10; anal I, 3 to 5 ..... *Chaetostomus*, p. 37.
a^2. Dorsal fin, I, 6; anal I, 5 or 6 ..... *Cyclopium*, p. 37.

Genus CHAETOSTOMUS Tschudi.

48. CHAETOSTOMUS LOBORHYNCHUS (Tschudi).

Chaetostoma loborhynchos Tschudi, Fauna Peruana, Pisc., 1845, p. 26, pl. 4; Rio Tullumayo, Andes of Peru.

Chaetostomus loborhynchus Günther, Cat. Fish. Brit. Mus., vol. 5, 1864, p. 250.—Regan, Monograph Fish. Fam. Loricariidae, Trans. Zool. Soc. London, vol. 17, 1904, p. 246.—Eigenmann, Cat. Freshwater Fishes of Tropical and South Temperate America, 1910, p. 410.

Genus CYCLOPIUM Swainson.

49. CYCLOPIUM SIMONSII (Regan).

Arges simonsii Regan, Monograph Fish. Fam. Loricariidae, Trans. Zool. Soc. London, vol. 17, 1904, p. 317, pl. 21, fig. 9; Huaras, Peru, 10,700 feet.

Cyclopium simonsii Eigenmann, Cat. Freshwater Fish., Tropical and South Temperate America, 1910, p. 417.

Family POECILIIDAE.

THE KILLIFISHES.

KEY TO PERUVIAN GENERA.

a^1. Ventrals present; jaws with bands of subconical, hooked teeth. *Aplocheilus*, p. 37.
a^2. Ventrals absent; teeth in jaws in a single series or in a narrow band; pharyngeal teeth present, slender ..... *Orestias*, p. 37.

Genus APLOCHEILUS McClelland.

50. APLOCHEILUS PERUANUS (Regan).

Haplocheilus peruanus Regan, Ann. Mag. Nat. Hist., vol. 12, 1903, p. 626; Perim, Peru, 800 meters.

Aplocheilus peruanus Eigenmann, Cat. Freshwater Fish. Trop. and South Temp. Amer., 1910, p. 454, name only.

Genus ORESTIAS Valenciennes.

KEY TO SPECIES.

a^1. Form elongate, in adult.
  b^1. Scales granulate.
    c^1. Mouth large; teeth many ..... *cuvieri*, p. 38.
    c^2. Mouth small; teeth few ..... *pentlandii*, p. 39.
  b^2. Scales striate; mouth small ..... *elegans*, p. 40.

a^2. Form medium elongate, in adult.
d^1. Scales striate; crown flat; mouth large_____*mülleri*, p. 40.
d^2. Scales smooth, in part; crown convex; mouth small.
c^1. Dorsal rays 15 or 16; anal rays 16 or 17_____*tschudii*, p. 40.
c^2. Dorsal 13–15; anal rays 13–15_____*agassizii*, p. 40.
c^3. Dorsal rays 13; anal rays 13_____*owenii*, p. 42.
a^3. Form short.
f^1. Belly naked.
g^1. Body rounded; head rounded.
h^1. Mouth small; scales striate_____*olivaceus*, p. 42.
g^2. Body compressed; head angular.
i^1. Scales granulate, in part.
j^1. Snout large; mouth wide.
k^1. Back only partly scaled_____*albus*, p. 42.
k^2. Back entirely scaled_____*neveui*, p. 42.
j^2. Snout narrow; mouth small_____*luteus*, p. 42.
i^2. Scales smooth, in part; back high_____*jussici*, p. 42.
f^2. Belly covered with scales.
l^1. Body much compressed_____*incae*, p. 42.

51. ORESTIAS CUVIERI Valenciennes.

OMANTO.

Orestias curieri Valenciennes, L'Inst., vol. 7, 1839, p. 118; Lake Titicaca.—Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 168 (225), pl. 532.—Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 147, pl. 3, fig. 11 (teeth).—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 779.
Orestias cuvierii Cope, Proc. Amer. Philos. Soc., vol. 17, 1877, p. 44.

One specimen, field, No. 555, 20.8 cm. in length, from Lake Titicaca near Puno.

Head 2 in length; depth 4; eye 6.6 in head, 2 in snout; snout 3.7; interorbital 3.3; length of pectoral 2; base of pectoral 4; D. 16; A. 18; scales 14–41; 23 scales on median line of back in front of dorsal.

Body elongate, slightly compressed; caudal peduncle rather slender, broadening at base of the fin: head large, one-third of length without caudal; crown broad, depressed and concave at occiput and snout, flattened in the middle; snout large, broad, blunt, rounded, nearly twice as long as eye; chin vertical; mouth wide, oblique, cleft reaching below the lower level of orbit; teeth strong, in bands, numerous, hooked, subconical; eye medium; scales of head and shoulder granular: a series of about 20 large vertebral scales in front of the dorsal; scales of the lateral line larger than those on each side of it; belly scaleless. On young individuals all the scales are flat, thin and concentrically striate; the granulation and thickening appear first at the head, then gradually extend farther back. Dorsal origin near halfway from head to caudal; fin low, rounded on upper margin, third ray above origin of anal; anal extending a little farther back than dorsal, in base and fin; pectorals about the size of the

anal, reaching halfway to vent. Caudal broad, hinder margin concave, more deeply indented in the young. (Garman.)

In this individual the caudal peduncle is not slender as in *O. pentlandii*, and the scaling of the head is very different; head naked, save for a few scales on top, cheek, and opercle; body scales anteriorly rugose; naked area on either side of median line of back not so large as in other specimens examined. This species is readily recognized from the others by the elongate head, large mouth, and well-developed teeth.

Color in alcohol, flesh-colored, dusky brownish on back, but much lighter than in our examples of *O. pentlandii.*

Common in Lake Titicaca.

52. ORESTIAS PENTLANDII Valenciennes.

BOGA.

Orestias pentlandii Valenciennes, L'Inst., vol. 7, 1839, p. 118; Lake Titicaca.—Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 172 (230), pl. 533.—Garman, the Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 148.

Orestias bairdii Cope, Journ. Phila. Acad. Nat. Sci., 1785 (1874–81), p. 185; Lake Titicaca.

Oriestias pentlandii Steindachner, Herpet.-ichthyol. Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 58, pl. 4, fig. 4.—Pellegrin, Bull. Soc. Zool. France, vol. 29, 1904, p. 92.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 779.—Pellegrin, Poiss. Lacs Hauts Plateaux de l'Amer. du Sud, 1906, pp. 126, 127, 129, fig. 19*i*.

Four specimens, field No. 554, 18.1, 18.8, 19.5, and 20 cm. in length, from Lake Titicaca, near Puno.

Head 3.38 to 3.46 in length; depth 3.9 to 4.2; eye 5.37 to 5.76; snout 3.2 to 3.5; interorbital 2.58 to 2.68; caudal peduncle 2.68 to 2.88; D., 13–15; A., 15–17; scales about 55.

Body elongate, slightly compressed; caudal peduncle long and slender, broadening at base of caudal, much slenderer than in *O. cuvieri;* head short, broad at occiput, but narrowing toward tip of snout; snout blunt, rounded, chin vertical, lower jaw not projecting so strongly as in *O. cuvieri;* mouth moderate, nearly vertical, cleft of mouth reaching lower level of eye; teeth elongate, hooked, in a single row in jaws, easily broken, comparatively few; interorbital broad, rounded, upper profile of head comparatively straight or with a slight depression in front of eyes; insertion of dorsal slightly nearer base of caudal than posterior border of opercle, or midway between the two; caudal concave; insertion of anal under second dorsal ray. Scales small, thin, somewhat deciduous, those about head and shoulders somewhat rugose, this characteristic of the scales

disappearing posteriorly; side scaled to base of pectoral or lower, the naked area of belly including the base of the anal; front of pectoral naked; top of head to front of eyes fully or partly scaled; area around and in front of eye naked or with several scales; 21–24 scales on median line of back between head and origin of dorsal, 16 or 17 rows between origin of dorsal and origin of anal.

Color in alcohol, back dusky brown; belly fleshy colored, tinged with yellow; fins dusky.

This is said to be a very good food fish.

53. ORESTIAS ELEGANS Garman.

Orestias eleyans Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 149; Lagunas de la Cordillera de la Ascension; small lakes among headwaters of Rimac River.

54. ORESTIAS MÜLLERI Valenciennes.

Orestias mülleri Valenciennes in Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 179 (240).—Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 149; Lake Titicaca.

55. ORESTIAS TSCHUDII Castelnau.

Orestias tschudii Castelnau, Exp. Amer. Sud., Poiss., 1855, p. 51, pl. 27, fig. 1.—Pellegrin, Bull. Soc. Zool. France, vol. 29, 1904, p. 92; Poiss. Lacs Hauts Plateaux de l'Amer. du Sud, 1906, pp. 127, 129, fig. 19*ii*.

Contrary to the opinion of later writers, Pellegrin states that this species differs from *O. agassizii*.

56. ORESTIAS AGASSIZII Valenciennes.

CARACHITO.

Orestias agassizii Valenciennes in Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 178 (275); Corocoro.—Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 150.—Steindachner, Herpet.-ichthyol. Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 58, pl. 3, fig. 3.—Pellegrin, Bull. Soc. Zool. France, vol. 29, 1904, pp. 93–94.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 780.—Pellegrin, Poiss. Lacs Hauts Plateaux de l'Amerique du Sud, 1907, pp. 19–23, pl. 14, fig. A–D.—Evermann and Radcliffe, Notes on a Cyprinodont (*Orestias agassizii*) from Central Peru, Proc. Biol. Soc. Washington, vol. 22, 1909, pp. 165–170.

Orestias ortonii Cope, Journ. Phila. Acad. Nat. Sci., 1875, p. 186 (1874–1881); Lake Titicaca.

Orestias frontosus Cope, Journ. Phila. Acad. Nat. Sci., 1875, p. 187 (1874–1881); Lake Titicaca.

Two specimens, field No. 562, 6.7 and 7.0 in length, from Lake Titicaca, taken at the dock at Puno.

Head and shoulders broad, heavy, and arched in adults, much more 4; interorbital 2.9 to 3; D. 14; A. 15; scales 31–2.

Head 3.37 to 3.56 in length; depth 3 to 3.45; eye 4 in head; snout compressed in the young; mouth small, nearly vertical; cleft of mouth extending to lower level of orbit. This character is subject to considerable variation; in adults it may reach a considerable distance below level of orbit. Jaws with two series of small, simple, conical, hooked teeth, those in the inner row fewer and smaller; in young examples often none or only one or two of the inner series visible.

Origin of dorsal in advance of anal, slightly nearer caudal than base of occiput, situated at distance equal to its base from caudal; caudal truncate or slightly rounded; ventrals absent.

The scales of the largest specimens are large, convex, horny, and smooth anteriorly, becoming smaller, flattened, and finely striate posteriorly; those above pectoral and on sides and top of head are polished; those on sides of caudal peduncle more or less deciduous; breast and belly naked; top of snout and an area around eye, more or less scaleless; scales in transverse series 14 or 15, 20 on median line of back between nape and origin of dorsal, those on cheek arranged in 3 or 4 rows. In young individuals the scales are all very thin, finely striate and not polished.

The coloration of this species is subject to considerable variation, and Pellegrin has described four varietal forms based mainly on these differences in coloration. Individuals from La Fundicion, studied by the present writers,[1] indicate that there are no hard and fast lines of separation.

Color of adults, dusky olive on back and sides; ventral surface white or yellowish white, the duskiness of the sides encroaching on this area in older examples; in some specimens some of the scales on sides, especially on the head and caudal peduncle, have light centers with dusky edges. Some individuals have a broad, indistinct, dark band on sides, margined below with yellow; dorsal and anal dusky, without black areas or blotches; base of dorsal usually jet black; caudal and pectoral dusky to lightish; axil and base white or dusky white, margined with dusky.

Some smaller individuals have quite a distinct dark band from opercle to base of caudal, most distinct on caudal peduncle; dorsal and caudal with a few irregular black areas on rays near base, giving the fin a punctulated appearance. Other specimens have the band more distinct and a row of about a dozen irregular black spots along each side of the back; below these and alternating with them in some specimens there is a second row; the dark blotches are more pronounced and extend nearer to the free margin. Still others have 3 or

[1] Proc. Biol. Soc. Wash., vol. 22, 1909, pp. 165–170.

4 rows of irregular dusky or black blotches on sides, those replacing the horizontal band often more or less coalescent posteriorly; in some of these specimens the dorsal and caudal are only lightly dotted with dusky, in others the spots are almost jet black. Between these various color-patterns are intergrading forms.

57. ORESTIAS OWENII Valenciennes.

Orestias owenii Valenciennes in Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 180 (241); Urcos Lake, Cusco.—Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 152.

58. ORESTIAS OLIVACEUS Garman.

Orestias olivaceus Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 152; Lake Umayo, Peru.

59. ORESTIAS ALBUS Valenciennes.

Orestias albus Valenciennes, L'Inst., vol. 7, 1839, p. 118.—Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 180 (242), pl. 537; Lake Titicaca.—Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 153.—Pellegrin, Note Poiss, lacs Titicaca et Poopo, Bull. Soc. Zool. France, vol. 29, 1904, p. 94.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 780.—Pellegrin, Poiss., Lacs Hauts Plateaux l'Amer. du Sud, 1906, pp. 126, 136, fig. 19*iii*.

60. ORESTIAS NEVEUI Pellegrin.

Orestias neveui Pellegrin, Bull. Soc. Zool. France, vol. 29, 1904, p. 95; Lake Titicaca; Poiss. Lacs Hauts Plateaux l'Amerique du Sud, 1907, p. 24.

61. ORESTIAS LUTEUS Valenciennes.

Orestias luteus Valenciennes, L'Inst., vol. 7, 1839, p. 118.—Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 181 (243); Lake Titicaca.—Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 154.—Pellegrin, Note Poiss., lacs Titicaca et Poopo, Bull. Soc. Zool. France, vol. 29, 1904, p. 96.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 781.—Pellegrin, Poiss., Lacs Hauts Plateaux l'Amer. du Sud, 1906, pp. 126, 127, 134, fig. 19*iv*.

62. ORESTIAS JUSSIEI Valenciennes.

Orestias jussiei Valenciennes in Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 18, 1846, p. 176 (235), pl. 535; Lake Titicaca, Guaracona River, and Lake Chinchoro.—Günther, Cat. Fish. Brit. Mus., vol. 6, 1866, p. 329.

Orestias jussieui Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 155.

63. ORESTIAS INCAE Garman.

Orestias incae Garman, The Cyprinodonts, Mem. Mus. Comp. Zool., vol. 19, 1895, p. 155; Lake Titicaca.

Family BELONIDAE.

THE NEEDLEFISHES.

Genus TYLOSURUS Cocco.

64. TYLOSURUS STOLZMANNI (Steindachner).

Belone stolzmanni Steindachner, Ichth. Beitr., vol. 7, 1878, p. 21; Tumbes. Peru.

Tylosurus stolzmanni Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 713.—Gilbert and Starks, Fishes Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 53.

Family HEMIRHAMPHIDAE.

THE BALAOS, OR HALFBEAKS.

Genus HYPORHAMPHUS Gill.

65. HYPORHAMPHUS UNIFASCIATUS (Ranzani).

CHOELO.

Hemirhamphus unifasciatus Ranzani, Nov. Comm. Acad. Sci. Bonon., vol. 5, 1842, p. 326; Brazil.

Hyporhamphus unifasciatus Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 720; vol. 4, 1900, pl. 116, fig. 311.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 52.

One specimen, field, No. 1029, 28.3 cm. in length from Capon.

Head, including mandible, 2.92 in length of body from tip of mandible to base of caudal, 2.47 in length from tip of upper jaw to base of caudal; head from tip of upper jaw 5.36 (4.53); depth 8.5 (7.23); distance from tip of mandible to origin of dorsal 1.24 (1.03); distance from tip of mandible to origin ventrals 1.58 (1.34); eye 7.33 in head, including mandible, 4.53 in head measured from tip of upper jaw; interorbital 6.88 (3.75); pectoral 2.84 (1.55); D. 14; A. 15; scales 52.

Length of mandible from tip of upper jaw less than rest of head, 2.2 (1.2) in head; anal opposite dorsal; ventrals inserted midway between posterior border of eye and base of caudal; lower caudal lobe longest; scales large, dorsal and anal densely scaled.

Color in alcohol, back dusky bluish; sides and belly silvery, tinged with yellow; fins dusky.

Family EXOCOETIDAE.

THE FLYINGFISHES.

KEY TO GENERA.

a^1. Ventral fins inserted anteriorly, much nearer tip of snout than base of caudal, not used as organs of flight, their tips not reaching nearly to front of dorsal; anal fin long, its base nearly equal to that of dorsal—*Exocoetus*, p. 44.

a^1. Ventrals inserted posteriorly, more or less nearer base of caudal than tip of snout, used as organs of flight, and their tips reaching past middle of base of anal; anal fin short, not equal to dorsal fin_____*Cypsilurus*, p. 44.

Genus EXOCOETUS Linnaeus.

66. EXOCOETUS VOLITANS Linnaeus.

Exocoetus volitans Linnaeus, Syst. Nat., ed. 10, 1758, p. 316; locality not known.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 734; vol. 3, 1898, p. 2835.—Abbott, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 337.—Jordan and Evermann, Fishes Hawaiian Islands, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903, p. 132, fig. 45.

Exocoetus chilensis Abbott, Proc. Acad. Nat. Sci. Phila., 1860, p. 472—Delfin, Cat. Peces de Chile, 1901, p. 44.

Doctor Coker has the folowing note on some fish eggs:

Eggs were purchased in the market of Arequipa, July 26, 1908. They constitute a common market article known as "cau-cau." According to the fishermen of Mollendo, these are the eggs of the flying fish, "volador," and are found abundantly in the early summer, beginning with October. Large quantities are dried for later use. This specimen of cau-cau, obtained moist in the market, was said to have been freshened by soaking in water. Dry specimens could also be obtained.

Delfin, in his Catálogo de los Peces de Chile (1901, p. 44), states that the common name of *Exocoetus chilensis* Abbott is "pez volador."

Abbott[1] places this species in the synonymy of *E. volitans;* thus it appears that the eggs seen in the market may belong to this species.

Genus CYPSILURUS Swainson.

67. CYPSILURUS SPECULIGER (Cuvier and Valenciennes).

Exocoetus exiliens Jenyns, Zool Voy. *Beagle*, Fish., 1842, p. 122 (not of Gmelin); coast of Peru.

Exocoetus speculiger Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 19, 1846, p. 94.

Exocoetus rufipinnis Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 19, 1846, p. 99; Paita, Peru.

Exonautes speculiger Jordan and Evermann, Fish. North and Mid. Amer., vol. 3, 1898, p. 2836.—Abbott, Marine Fishes Peru. Proc. Acad. Nat. Sci. Phila., 1899, p. 337.

Cypsilurus speculiger Jordan and Seale, Fishes Samoa, Bull. U. S. Bur. Fish., vol. 25, 1905 (1906), p. 209, fig. 13.

The flyingfish taken by Charles Darwin off the coast of Peru and identified by Jenyns as *Exocoetus exsiliens* Bloch, is undoubtedly this species.

[1] Proc. Phila. Acad. Nat. Sci., 1899, p. 337.

Family ATHERINIDAE.

THE SILVERSIDES.

KEY TO GENERA.

a^1. Premaxillaries not freely protractile, the skin of upper jaw mesially continuous with that of the forehead.

b^1 Teeth simple, pointed, arranged in villiform bands.

c^1. Vomerine teeth usually present, at least in the young; dorsal spines 4, distinct ..... *Atherinopsis*, p. 45.

c^2. No vomerine teeth; first dorsal represented by a single rudimental spine ..... *Protistius*, p. 46.

a^2. Premaxillaries freely protractile, the skin not continuous with that of the forehead; scales cycloid, of small size (67 to 105), soft dorsal and anal mostly without scales ..... *Basilichthys*, p. 47.

Genus ATHERINOPSIS Girard.

68. ATHERINOPSIS REGIUS (Humboldt).

PEJE-REY DE RIO.

Atherina regia Humboldt in Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 10, 1835, p. 352; Coast of Peru.

Atherina microlepidota Jenyns, Zool. Voy. *Beagle*, Fish., vol. 2, p. 78, pl. 16, figs. 1, 2, *a*, *b*; Valparaiso.

Gastropterus archaeus Cope, Proc. Amer. Philos. Soc., vol. 17, 1878, p. 700; Arequipa, Peru.—Eigenmann, Cat. Freshwater Trop. and South Temp. Amer., 1910, p. 464.

Pisciregia beardsleei Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 342; Callao.

Atherinopsis regius Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 39; Rio Tambo, southern Peru.—Eigenmann, Cat. Freshwater Fish. Trop. and South Temp. Amer., 1910, p. 465.

Gastropterus beardsleei Eigenmann, Cat. Freshwater Fish. Trop. and South Temp. Amer., 1910, p. 464.

Two specimens, field No. 427, 11.1 and 12.3 cm. in length, from the Rimac River near Lima.

Head 4.04 in length; depth 5.3 to 5.5; eye 4.5 to 5 in head; snout 2.85 to 3; maxillary 2.85 to 3; interorbital 2.65 to 2.75; pectoral 1.2 to 1.3; ventrals 2.5; D. IV, 1, 11; A. I, 15; scales about 20–90–3.

Head broad, depressed; top of head, cheeks, opercle and suborbital scaled; snout, preorbital and maxillaries naked; teeth in jaws in 3 or 4 series, large, recurved, the outer row somewhat larger than the others; a number of small recurved teeth on vomer, these small and may easily escape detection in the mucus about them; premaxillary not protractile, its skin continuous with that of the forehead; interdorsal space very short; origin of first dorsal slightly anterior to middle of distance from tip of snout to tip of caudal; anterior rays of second dorsal and anal elongate; caudal forked, the lobes not widely diverging; gillrakers short and stout, 4+15.

Color in alcohol: Back dusky olive; a reddish brown lateral stripe, bordered above with bluish, having the same form as in *Chirostoma;* sides and belly lighter than back, yellowish, tinged with silvery; fins dusky.

Humboldt's conclusion that this is the common pejerey of the Callao market, and that it occurs in large numbers in the ocean within the limits of Peru is doubtless an error. That it is the "pesce rey" reported to occur in the mountain lakes of Peru and in Titicaca; identified by Abbott from specimens from Callao as *Pisciregia beardsleei;* by Cope on specimens from Arequipa as *Gastropterus archaeus;* by Steindachner, on specimens from the Rio Tambo as *Atherinopsis regius*, and by Jenyns, on specimens from fresh water at Valparaiso as *Athernia microlepidota*, appears to us to be true. It is the "peje-rey de Rio," and not one of the salt-water forms which belong to the genus *Basilichthys.* The greatest discrepancy between Jenyns's description of *A. microlepidota* and our specimens is in the depth of the body.

The following additional measurements of our largest specimen, compared with those given by Cope for *G. archaeus*, are illustrative of the closeness with which his description agrees with our specimens. (The comparative measurements taken from Cope's figures are placed in parenthesis following our own.) Head 4.74 (4.74) in total length; distance from tip of snout to origin of ventral fin, 2.67 (2.63), to origin of anal, 1.86 (1.85), to origin of second dorsal, 1.68 (1.73); tip of the pectoral reaching three-fourths of distance from its base to base of ventral, and tip of ventral three-fifths of the distance from its base to insertion of anal.

As indicated by Steindachner, the presence of teeth on the vomer appears to be largely an age character. An examination of examples of *Atherinopsis californiensis*, the species upon which this genus is based, appears to bear out these conclusions.

The scales are small, rather thick; numerous very distinct concentric lines on their outer surface and from four to six well-developed radiating striae on the basal half, rendering them readily distinguishable from the other peje-reys in our collection.

Genus PROTISTIUS Cope.

69. PROTISTIUS SEMOTILUS Cope.

Protistius semotilus Cope, Proc. Acad. Nat. Sci. Phila., 1874, pp. 66–7; Peruvian Andes, 12,000 feet; Proc. Amer. Philos. Soc., 1877, pp. 700–701.—Eigenmann, Cat. Freshwater Fish. Trop. and South Temp. Amer., 1910, p. 464.

Cope [1] says that *Gastropterus archaeus*, which we consider synonymous with *Atherinopsis regius*, differs from this species in addition to generic characters noted, "in the large number of soft rays, the smaller eye, narrower interorbital space, etc."

[1] Proc. Amer. Philos. Soc., 1877, p. 701.

Genus BASILICHTHYS Girard.

KEY TO SPECIES.

a^1. Depth of body 5 to 5.6 in length; five to seven spines in first dorsal; interdorsal space .15 to .175 of the total length ..... *affinis*, p. 47.

a^2. Body slender, its depth 6.8 in length; 8 spines in first dorsal; interdorsal space .19 of the total length ..... *octavius*, p. 49.

70. BASILICHTHYS AFFINIS (Steindachner).

PEJE-REY.

Plate 4, fig. 3.

Chirostoma affine STEINDACHNER, Fauna Chilensis, 1898, p. 313; Iquique; Herpet.-ichthyol. Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 40; Callao, Peru, Market.

Basilichthys regillus ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 339; Callao.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 783; Callao.

Basilichthys jordani ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila, 1899, p. 341; Callao.

Basilichthys affinis ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 342.

Two specimens, field No. 409, 25 and 27 cm. in length, from Callao, and three specimens, No. 09620, 19 to 21 cm. in length, from Paracas Bay region of Pisco, taken June 30. This species was spawning at that time. Point Lastre of the chart, locally known as Punta peje-rey, is the favorite fishing ground for these large Atherinoids during their spawning season.

Seven specimens, field No. 09154, 6.1 to 17.3 cm. in length, from Ancon, taken by a haul with the seine (Chinchoro) on the beach.

Head 4 to 4.25 in length; depth 5 to 5.6; eye 4.3 to 5.5 in head; snout 2.9 to 3.15; interocular 3 to 3.66; D. VI or VII–1, 9 or 10; A. I, 16 or 17; transverse rows of scales 85 (+3); in cross-series between origin of second dorsal and origin of anal 15.

Body somewhat spindle-shaped; head long, depressed; jaws subequal, premaxillaries protractile; premaxillary teeth mainly in two rows, two additional partial series; vomerine teeth variable; in one of the larger specimens they are mainly in three patches, one at the apex and the others at the sides but not symmetrically placed; in other large examples they are quite symmetrical, the definite separations into patches often disappearing. In other examples, especially the smaller individuals, the teeth are few, bristle-like, easily broken off or apparently absent. In those specimens in which large, well-developed teeth are present, there are smaller bristle-like teeth

among them. Maxillary scarcely reaching the vertical from anterior border of eye; eye large, 1.33 in snout.

Scales thin, somewhat deciduous, the concentric lines and radiating striae partially absent or much less distinct than in *Atherinopsis regius;* jaws and snout naked; top of head scaled to front of eyes, these forming a sort of shield.

In examples 20 to 27 cm. in length the insertion of the first dorsal is midway between base of caudal and anterior border of eye; in specimens about 18 cm. in length it is about one diameter of eye nearer base of caudal than tip of snout, and in small individuals it is about midway between tip of snout and base of caudal. In these examples the interorbital space is scarcely as constant as that recorded by Abbott, varying from 15 to 17.5 hundredths of the total length; origin of second dorsal above fifth or sixth anal ray; caudal forked; ventrals short; pectoral 1.45 to 1.55 in head.

Color in alcohol of two large examples from Callao, silvery gray, back above lateral stripe dusky, a median stripe along back and a broad lateral stripe of blue. In the other examples the body has a decidedly brownish wash and the lateral stripe is more distinct. Steindachner records the same coloration for a specimen 18.6 cm. in length from Callao as for our examples from that locality.

That *B. regillus* and *B. jordani* of Abbott are synonymous with this species there seems little doubt. Abbott's statement in description of *B. regillus* that "origin of first dorsal is nearer snout than base of caudal by one-third length of head," should, according to Starks,[1] read, "nearer base of caudal than snout by one-third length of head." The main remaining difference between *B. regillus* and *B. jordani* lies in the reported presence of vomerine teeth. Prof. J. O. Snyder has kindly reexamined Abbott's types and cotypes of *B. regillus*, *octavius*, and *jordani* and has given us the following notes on vomerine teeth:

Type of *Basilichthys jordani:* The right side of the vomer has been destroyed. The center and left side have a few scattered teeth which are about one-fourth as large as the largest teeth on the jaws; they are rather evenly distributed and are not anywhere grouped in patches.

Cotype of *B. jordani:* On the vomer are two classes of teeth. First larger ones, closely opposed and segregated in two patches, one on each side, the patches being dissimilar in size and location, that on the left side being larger, of stronger teeth and more anterior in position. Second, very minute, short, bristle-like teeth scattered over the surface of the bone between the patches of larger teeth.

Type of *B. octavius:* The soft tissue has all been scraped from the vomer. The vomer is very rough on each side and somewhat pitted

[1] Proc. U. S. Nat. Mus., vol. 30, 1906, p. 783.

in the regions occupied by the patches of teeth in the cotype of *B. jordani*.

Type of *B. regillus:* A few minute, very short bristles (teeth) on the vomer.

Cotypes of *B. regillus:* (*a*) Small teeth in two rather indefinitely outlined patches, one on each side of the vomer. (*b*) No teeth. Vomer with enlarged, rough surfaces in the region occupied by teeth in (*a*). (*c*) A few minute, scattered teeth on vomer. (*d*) An elongate patch of a few small teeth on each side of the vomer. Four comparatively strong teeth on anterior, central part of bone.

(In all of these specimens the vomer has been more or less severely scraped, as if an attempt to detect teeth by rubbing with a sharp instrument had been made.)

Regarding *Basilichthys affinis*, Abbott writes: "This species apparently closely resembles the preceding. It appears to differ from *B. jordani* in the absence of vomerine teeth, and from *jordani*, *regillus*, and *octavius* in the much shorter head and in position of the first dorsal. Steindachner's description of an example from Callao and our own specimens indicate that these differences do not exist."

71. BASILICHTHYS OCTAVIUS Abbott.

Basilichthys octavius Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila, 1899, p. 340; Callao.

Family MUGILIDAE.

THE MULLETS.

KEY TO GENERA.

a^1. Orbit with a well-developed adipose eyelid, covering part of the iris; cilia in one or few series, slender; cleft of mouth chiefly anterior—*Mugil*, p. 49.

a^2. Orbit without distinct adipose eyelid; jaws with small labial, ciliiform, pectinate, movable teeth, in two rows, often traces of a third row present ---------- *Neomyxus*, p. 51.

Genus MUGIL (Artedi) Linnaeus.

72. MUGIL CEPHALUS Linnaeus.

LIZA; LICITA.

Mugil cephalus Linnaeus, Syst. Nat., ed. 10, 1758, p. 316.—Jordan and Evermann, Fish. North and Mid. Amer., vol. 1, 1896, p. 811.—Steindachner, Fauna Chilensis, 1898, p. 315.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 343.—Delfin, Cat. Peces de Chile, 1901, p. 48.—Steindachner, Herpet.-ichthyol. Ergebnisse einer Reise nach Südamerika, Denkschr., Akad. Wiss. Wien, vol. 72, 1902, p. 40.—Jordan and Evermann, Fish. Hawaiian Islands, Bull. U. S. Fish. Comm., vol. 23, pt. 1, 1903, p. 140, fig. 48.

Mugil rammelsbergii TSCHUDI, Fauna Peruana, Ichth., 1845, p. 20.—DELFIN, Cat. Peces de Chile, 1901, p. 48.

Mugil liza GAY (not Cuvier and Valenciennes) Hist. Chile Zool., vol. 2, 1846, p. 256, I, Atlas Zool., pl. 4 bis, fig. 2, 1854.

Mugil mexicanus STEINDACHNER, Ichth. Beitr., vol. 3, 1875, p. 59, pl. 8.

Mugil charlottae STEINDACHNER, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 41, pl. 4, fig. 2, 2*a*; Guayaquil, Ecuador.

Two specimens, field No. 444, 20.9 and 29.5 cm. long, from Callao; 4, field No. 09153, 10 to 15.6 cm. long, from Ancon, taken on beach with seine; 4, field No. 563, 14.7 to 15.7 cm. long, from the market of Arequipa, stated to be from Rio Tambo; 16, field No. 302, 3.4 to 7.9 cm. long, and 3 specimens, No. 300, 10.7 to 15 cm. long, from Rio de Eten, about 1 mile from the mouth, Eten; 3, field No. 271, 11 to 11.6 cm. long, from Rimac River below Lima; 6, field No. 09428, 4.7 to 8.5 cm. long, and 10 specimens, No. 09429, 3.6 to 4.4 cm. long, from Pacasmayo, where it was abundant; and 21, field No. 73, 3.9 to 4.2 cm. long, from Callao. Everywhere near the mole the water swarmed with these little fishes.

Head 3.6 in length; depth 3.85; eye 4.3 in head; snout 4.33; maxillary 3.85; interorbital 2.24; pectoral 1.73; ventrals 1.91; D. IV–I, 8; A. III, 8; scales 40 (+3)—13.

Body robust, dorsal and ventral outline evenly arched, moderately deep; head depressed, jaws subequal; maxillary reaching vertical from anterior border of eye; a single row of very small slender teeth on outer fleshy edge of each jaw; eye moderate, adipose eyelid well developed, covering eye except pupil; interorbital broad and flat; distance from tip of snout to origin of spinous dorsal 1.98 in length; distal border of soft dorsal and anal concave; caudel forked; ventrals short, tips reaching midway from base to vent; pectoral short, not reaching vertical from origin of spinous dorsal; scales large, regular; head scaled; soft dorsal and anal without scales.

Color in alcohol, back dusky, bluish, sides and belly silvery, centers of scales on sides dusky, forming longitudinal dusky stripes bordered by stripes of silver; fins dusky, base of pectoral dusky. Description of a specimen 29.5 cm. in length from Callao.

Another individual from the same locality, 20.9 cm. in length, has head 3.54 in length; depth 3.95; eye 4 in head; snout 4.36; maxillary 4; interorbital 2.3; pectoral 1.66; ventral 1.92; D. IV–1, 8; A. III, 8; scales 40 (+3)—13.

An example 13 cm. in length from Eten has head 3.4; depth 3.62; eye 4.44; snout 4.15; maxillary 4.15; interorbital 2.38; pectoral 1.55; ventrals 1.82.

Behind the outer row of teeth in the lower jaw, slender bicuspid teeth occur—these can not be made out in the large examples and in

some of the others barely show through the mucous; in small specimens they are easily seen with the lens.

Examples from the Arequipa market were bluish on back, silvery white on belly.

This widely distributed species is undoubtedly the most abundant Mugil occurring on the coast of Peru, and is at once recognized by the almost entire absence of scales on the soft dorsal and anal and the longitudinal dark stripes along the rows of scales.

Genus NEOMYXUS Steindacher.

73. NEOMYXUS CILIILABIS (Cuvier and Valenciennes).

Mugil ciliilabis Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 11, 1836, p. 112 (151); Callao de Lima.

Myxus ciliilabis Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 467.

Neomyxus ciliilabis, Kendall and Radcliffe, Mem. Mus. Comp. Zool., vol. 35, No. 3, p. 88, April, 1912; Chatham Island.

Family SPHYRAENIDAE.

THE BARRACUDAS.

Genus SPHYRAENA (Artedi) Bloch and Schneider.

74. SPHYRAENA IDIASTES Heller and Snodgrass.

AGUJA; PEJE-AGUJA.

Sphyraena idiastes Heller and Snodgrass, Proc. Washington Acad. Sci., vol. 5, 1903, p. 190, pl. 2; Seymour Island, Galapagos Archipelago.—Snodgrass and Heller, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 354.

One specimen, field No. 09730 (=09405), 53.7 cm. in length, from Guanape North Island, and one specimen, No. 09694, 54 cm. in length, from Lobos de Tierra. According to fishermen, these fishes keep near the shore.

Head 3.03 in length; depth 7.85; eye 7.5 in head; snout 2.42; maxillary 2.83; interorbital 5.8; pectoral 3.33; D. V–I, 9; A. II, 8; scales 20–145–13; 137 pores in lateral line.

Body slender, elongate, fusiform; head slender, conical; snout pointed; lower jaw longer, projecting beyond upper a distance equal to two-fifths diameter of eye; maxillary not reaching vertical from anterior border of eye by a distance equal to diameter of pupil; preorbital narrow, 2 in eye; teeth in jaws in a single series, smooth, compressed, pointed, those on lower jaw longer and stronger; a single stout tooth at tip in front of lower jaw; two elongate teeth on inner premaxillaries, pointed backward, behind these in the same straight line, on palatines there is a row of similar elongate teeth,

becoming smaller posteriorly; eye large; border of preopercle without serrations; distance from tip of lower jaw to origin of first dorsal 2.06 in length; first dorsal spine longest, 4.28 in head; caudal deeply forked; ventrals short, 3.5 in head, tips reaching one-third the distance from base of ventrals to origin of anal; scales small, lateral line with a slight downward curve over pectoral; scales of lateral line large, pores raised; cheeks and opercles scaled, those on cheeks very small.

Color in alcohol: Back and sides above lateral line slaty brown; sides below lateral line and belly salmon red; dorsal, caudal, and anal blackish; pectorals and ventrals dusky yellowish. Description based on a specimen, 53.7 cm. in length, from Guanape, North Island.

Family POLYNEMIDAE.

THE THREADFINS.

Genus POLYDACTYLUS Lacépède.

75. POLYDACTYLUS APPROXIMANS (Lay and Bennett).

BARBUDO.

Polynemus approximans Lay and Bennett, Beechey's Voyage, Zool. Fish., 1849, p. 57; Mazatlan.

Polydactylus approximans Evermann and Jenkins, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 137; Guaymas.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 829.—Abbott, Proc. Acad. Nat. Sci. Phila., 1899, p. 344.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 783.

One specimen, field No. 1015, 20.7 cm. long, from Tumbes, taken with a casting net ("ataraya") at the mouth of the Tumbes River.

Head 3.33 in length; depth 3.26; eye 4.1 in head; snout 5; maxillary 2.18; interorbital equal to eye, 4.1; pectoral equal to head, simple rays much longer, reaching beyond origin of anal; D. VIII–1, 12($\frac{1}{2}$); A. III, 14; scales 6–60–11.

Body deep, compressed, dorsal outline rounded; head short, compressed; snout pointed, projecting beyond maxillaries a distance of at least one-half diameter of orbit; tip of snout on level of middle of eye and falling away very obliquely to maxillaries, the anterior border of which is little in advance of anterior margin of eye; mouth small, center of maxillary falling below center of eye; third dorsal spine longest, 1.45 in head; anterior and posterior rays of dorsal longest, the distal margin semicircular; caudal deeply forked, the lobes longer than head; anal spines very weak; pectoral filaments long, 6 in number.

Color silvery yellow, dusky on back; pectorals black; a black area on opercules.

Pacific coast of America from Guaymas to Peru; a common food fish, known from Guaymas, Mazatlan, Chiapam, Punta Arenas, Panama, Guayaquil, Tumbes, and Callao.

Family SYNGNATHIDAE.

THE PIPEFISHES.

Genus SIPHOSTOMA Rafinesque.

KEY TO SPECIES.

a^1. D. 40 or 41; dorsal rays $1\frac{1}{2}+8$; body rings 18+42; head and body 2.60 in total length ..... *aciculare*, p. 53.

a^2. D. 35–37; body rings 20 or 21+50; body 1.5–1.67 in tail ..... *blainvilliana*, p. 53.

76. SIPHOSTOMA ACICULARE (Jenyns).

AGUJA.

Syngnathus acicularis Jenyns, Zool. Voy. *Beagle*, Fishes, 1842, p. 147, pl. 27, fig. 3; Valparaiso.—Guichenot in Gay, Hist. Chile, Zool., vol. 2, 1845, p. 347.—Steindachner, Fauna Chilensis, 1898, p. 331.

Siphostoma aciculare Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 338.

Four specimens, field No. 09156, 13.5–15.3 cm. long, from Ancon, taken with seine on beach, seem to be referable to this species.

Head 7.28 to 7.45 in total length; head and trunk 2.6; trunk 4.02; snout 2 to 2.1 in head; eye 7 to 8; pectoral 4 to 4.2; D. 40–1; dorsal rings $1\frac{1}{2}+8$; body rings 18+42. Nuchal plates with a median ridge; dorsal fin commencing slightly in advance of vent; anal very small; caudal well developed. Color in alcohol brown, dorsal translucent.

77. SIPHOSTOMA BLAINVILLIANA (Eydoux and Gervais).

Syngnathus blainvillianus Eydoux and Gervais, Guerin, Mag. Zool., vol. 4, 1837, pl. 17; Voyage *Favorite*, Zool., 1839, p. 79, pl. 32.—Günther, Cat. Fish. Brit. Mus., vol. 8, 1868, p. 162.

Syngnathus blainvilleanus Gay, Hist. Chile, Zool., vol. 2, 1848, p. 348.

Leptonotus blainvillei Kaup, Pophobranchii of Brit. Mus., 1856, p. 46; Peru.

Syngnathus (*Leptonotus*) *blainvillianus* Steindachner, Fauna Chilensis, 1898, p. 331.

Leptonotus blainvillianus Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 338.

This species is recorded from Peru, Chile, India, Auckland Islands, and New Zealand.

Family SCOMBRIDAE.

THE MACKERELS.

KEY TO GENERA.

a^1. Caudal peduncle without median keel on each side; dorsal fins well separated, the interspace being less than half the length of the head; spinous dorsal short, of 9 to 12 spines ..... *Scomber*, p. 54.

a^2. Caudal peduncle with median keel; a small keel above and one below this; pectoral usually inserted below eye.

b^1. Teeth of jaws slender, subconical, little, if at all, compressed; gillrakers numerous; corselet distinct; pectorals inserted low; vomer toothless; palatines with a single row of rather strong conical teeth___*Sarda*, p. 55.

b^2. Teeth of jaws strong, subtriangular or knife-like, more or less compressed; villiform teeth on vomer and palatines; gillrakers comparatively few; pectorals inserted near level of eye; body elongate—*Scomberomorus*, p. 55.

Genus SCOMBER Linnaeus.

78. SCOMBER JAPONICUS Houttuyn.

CABALLA.

Plate 5, fig. 1.

Scomber japonicus Houttuyn, Verh. Holland. Maatsch. Weet., vol. 20, pl. 2, 1782, p. 331; Japan.—Jordan and Evermann, Fishes Hawaiian Islands, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903, p. 169.—Snodgrass and Heller, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 360.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 783.—Evermann and Kendall, A Comparison of the Chub-Mackerels of the Atlantic and Pacific Oceans, Proc. U. S. Nat. Mus., vol. 38, 1910, pp. 327–328.

Scomber colias Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 344.—Delfin, Cat. Peces de Chile, 1901, p. 49.—Steindachner, Herpet-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkscher. Akad. Wiss. Wien., vol. 72, 1902, p. 37 (not of Gmelin).

One specimen, field No. 09167, 23.8 cm. in length, from Chimbote, taken with a hook and line near the pier; and one specimen, field, No. 09519, 25 cm. in length, from Lobos de Tierra. Head 3.22 in length; depth 4.5; eye 3.6 in head; snout 3.22; maxillary 2.5; interorbital 4.73; pectoral 2.36; distance from tip of snout to origin of first dorsal 2.57 in length; distance from first dorsal to origin of second dorsal 3.33; distance from tip of lower jaw to base of ventral 2.66; D. IX–I, II–I–I–I–I–I; A. I–I, II–I–I–I–I–I; scales about 16–210–34; gillrakers long and slender, 12+28, longest 1.6 in eye; each gillraker is armed with long slender teeth. Spinous dorsal high, third dorsal spine highest, 2.41 in head; caudal forked; ventrals short, 2.96 in head; pectorals short.

Color in alcohol, back bluish with 25 to 30 wavy, dark-blue streaks extending down to middle of side; below these numerous dark spots, belly pale silvery; axil of pectoral black; area around base of spinous dorsal crossed by 6 narrow black bands.

This species is distinct from the Atlantic form, *Scomber colias* Gmelin, as has been shown by Evermann and Kendall.

Genus SARDA Cuvier.

79. SARDA CHILENSIS (Cuvier and Valenciennes).

CHANCILLA; SARAJONE; BONITO.

Pelamys chilensis Cuvier and Valenciennes, Hist. Nat. Poiss., vol 8, 1831, p. 163; Valparaiso.—Gay, Hist. Chile, Zool., vol. 2, 1848, p. 224.—Steindachner, Ichth. Notizen, vol. 7, 1868, p. 25.—Kitahara, Journ. Fish. Bur. Tokyo, vol. 6, pt. 1, 1897, p. 3, pl. 4, fig. 10.

Sarda chilensis Jordan and Gilbert, Proc. U. S. Nat. Mus., vol. 3, 1880, p. 27.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 872.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 345.—Delfin, Cat. Peces de Chile, 1901, p. 50.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 68.—Starks, Fishes from Eucador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 784.

One specimen, field, No. 09668, 43 cm. long, from Callao.

Head 3.63 in length; depth 4.15; eye 8 in head; snout 2.92; maxillary 2.15; interorbital 3.29; pectoral 2.15; D. XVIII–I, 13–VIII; A. II, 11–VI.

Body fusiform, elongate; head long; snout pointed, conical; jaws subequal; teeth in jaws in a single row, strong, conical, curved, about 40 in each jaw; similar teeth on palatines, none on vomer; maxillary reaching vertical from posterior border of pupil (agreeing with Gilbert and Starks's description of Panama individuals and not with Jordan and Evermann, p. 872, 1896); gillrakers long and slender, 8+16 (in this respect agreeing more closely with Jordan and Evermann); longest gillraker longer than diameter of eye, 2.40 in snout. Corselet well developed; lateral line wavy, curved sharply upward, under posterior third of soft dorsal; ventrals short, 2.96 in head.

Color in alcohol, bluish on back, becoming reddish brown on belly; fins dusky.

Genus SCOMBEROMORUS Lacépède.

80. SCOMBEROMORUS SIERRA Jordan and Starks.

SIERRA.

Scomberomorus sierra Jordan and Starks, Fishes of Sinaloa, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 428; Mazatlan.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 874.—Gilbert and Starks, Fishes of Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 68.

One specimen, field No. 09569, 56 cm. long, from Paita.

Head 4.8 in length; depth 6.5; eye 6.66 in head; snout 2.84; maxillary 1.75; pectoral 1.56 in head, 7.5 in length; D. XVII–16–VIII; A. II, 15–VIII.

Body slender, elongate, somewhat compressed anteriorly; snout pointed; mouth large, oblique; maxillary reaching to vertical from posterior border of orbit; jaws subequal; teeth in jaws in a single row, long, compressed, 33 fully developed teeth in the upper jaw and 30 in the lower; broad bands of villiform teeth on vomer and palatines; gillrakers 3+13.

Distance from tip of snout to first dorsal 4.1 in length; to second dorsal 1.81; height of longest rays of soft dorsal 1.75 in head; soft dorsal and anal falcate; ventrals short, 1.5 in snout; lateral line undulating.

Color in life, bluish above, silvery below; sides with bronze spots.

In spirits our specimen has four rows of round, dusky spots below lateral line, these most distinct before soft dorsal.

Family XIPHIIDAE.

THE SWORDFISHES.

Genus XIPHIAS Linnaeus.

81. XIPHIAS GLADIUS Linnaeus.

Xiphias gladius Linnaeus, Syst. Nat., ed. 10, 1758, p. 248.—Jordan and Gilbert, Synopsis, 1883, p. 420.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 894.—Delfin, Cat. Peces de Chile, 1901, p. 51.

Xiphius gladius Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 346.

We know of no record for Peru of this widely distributed species; it has been recorded from the coast of California and from Iquique and Talcahuano. Chile, and undoubtedly occurs within Peruvian waters.

Family CARANGIDAE.

THE PANJANOS OR PAMPANOS.

KEY TO GENERA.

a^1. Premaxillaries not protractile (except in very young); soft dorsal similar to anal; lateral line unarmed; dorsal spines feeble, 7 in number, connected; anal spines weak; pectoral fins long ..... *Neptomenus*, p. 57.

a^2. Premaxillaries protractile.

b^1. Anal fin much shorter than soft dorsal; its base not longer than abdomen; pectoral fin short, not falcate.

c^1. Maxillary with a distinct supplemental bone; membrane of dorsal spines persistent ..... *Seriola*, p. 58.

c^2. Maxillary without supplemental bone ..... *Trachinotus*, p. 62.

b^2. Anal fin about as long as soft dorsal, its base longer than abdomen; maxillary with a supplemental bone; lateral line arched anteriorly, usually armed posteriorly; pectoral long, falcate—

d^1. Dorsal and anal each with a single detached finlet; body slender. *Decapterus*, p. 58.

d^2. Dorsal and anal without finlets.

e^1. Lateral line with well-developed scutes for its entire length; body elongate ---------- *Trachurus*, p. 59.

e^2. Lateral line with scutes on its straight posterior portion only (these sometimes very few and small, especially in those species with the body much compressed).

f^1. Body oblong or more or less elevated, not as below; teeth of jaws in few series, or in one series, unequal, or at least not forming villiform bands, outer series above usually enlarged, lower teeth usually uniserial; vomer and palatines with teeth; maxillary broad ---------- *Caranx*, p. 61.

f^2. Body broad-ovate, very strongly compressed, its outlines everywhere trenchant, anterior profile nearly vertical, scutes almost obsolete ---------- *Vomer*, p. 62.

e^3. Lateral line without any scutes; body short and elevated, strongly compressed ---------- *Selene*, p. 62.

Genus NEPTOMENUS Günther.

82. NEPTOMENUS CRASSUS Starks.

COJINOBA; COJINOBITA.

Neptomenus crassus Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 784, fig. 8; Callao, Peru.

Three specimens, field Nos. 09660, 09662, and 09664, respectively, 20.8, 23, and 26 cm. in length, from Callao, and two specimens, field Nos. 543–4, 18.5 and 16.8 cm. in length, from Mollendo.

Head 2.75 to 3.3 in length; depth 3 to 3.3; eye 4 to 5 in head; snout 3.55 to 3.85; maxillary 3 to 3.25; interorbital 3 to 3.25; pectoral 1 to 1.15; D. VII, 1, 25–7; A. II, 18–21; scales small, about 15–85 to 90–33.

Measurements of an individual 26 cm. in length from Callao: head 2.96 in length; depth 3.1; eye 4.75 in head; snout 3.73; maxillary 3.22; interorbital 3.03; pectoral 1; D. VII, 1, 27; A. II, 27; scales 15–85–33, pores 90.

Body short, rather deep, compressed, ventral outline more strongly arched than dorsal, base of anal oblique, caudal peduncle slender, its depth equal to diameter of eye; head large; snout blunt, broadly rounded; interorbital broad, convex, 1.5 times horizontal diameter of eye; eye large, center of eye on level with tip of upper jaw; mouth moderate, oblique; maxillary reaching nearly to the vertical from the anterior border of the pupil; maxillary not protractile, skin of tip of snout continuous with that of upper lip; teeth five, villiform, in a single row in each jaw; no teeth on vomer or palatines, jaws subequal; nostrils small, close together, nearer tip of snout than anterior margin of eye; preorbital very narrow, one-half diameter of pupil;

entire margin of preopercle with fine, rather widely separated, denticulations, these covered by membranes or the tips rarely projecting; vertical border of preopercle concave, the angle evenly rounded, gill-rakers long and slender, longest 1.75 in eye, 6+17; scales small, cycloid, regular in arrangement; lateral line nearly straight; cheek and opercle with thin scales, rest of head naked. Dorsal spines weak, short, fitting into a groove, anterior rays of soft dorsal and anal longest, longest rays about 3 in head; caudal deeply forked; anal spines very weak; ventrals short, their tips reaching midway from base of ventrals to posterior border of vent; pectoral long, falcate, tip reaching to above origin of anal.

Color in alcohol: Brownish, dusky on back and light on belly; top of head black; fins dusky, axil of pectoral dark. Smaller individuals are silvery in coloration.

Doctor Coker states these are small individuals of a large species of fair rank.

This species resembles very closely *N. brama* from New Zealand.

Genus SERIOLA Cuvier.

83. SERIOLA PERUANA Steindachner.

Seriola peruana Steindachner, Ichth. Beitr., vol. 11, 1881, p. 13, fig. 1, 1*a*; Callao.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 347.

Genus DECAPTERUS Bleeker.

84. DECAPTERUS SCOMBRINUS (Valenciennes).

JUREL FINO.

Caranx scombrinus Valenciennes, Voy. de la *Venus*, 1846, p. 332, pl. 7, fig. 1; Galapagos Islands.

Decapterus scombrinus Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 908.

Decapturus scombrinus Snodgrass and Heller, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 362.

One specimen, field No. 09676, 28.5 cm. in length, from Lobos de Afuero.

Head 3.54 in length; depth 4.75; eye 4.1; snout 3.45; maxillary 3.04; interorbital 5.51; pectoral 1.52; D. VIII–I, 33–1; A. II–I, 28–1; scutes 33.

Body fusiform, caudal peduncle narrow, depressed, its height 1.5 in eye; snout pointed; eye moderate, nearly as long as snout; mouth oblique; maxillary not reaching vertical from anterior border of eye; teeth in upper jaw very small, few in number in front of jaw; a single row of larger teeth in lower jaw; no teeth on vomer and palatines; a median, longitudinal row on the tongue.

Scales small; cheeks and opercles scaly, rest of head naked; lateral line with a moderate arch becoming straight above fourth anal ray; scales of lateral line enlarged; scutes rather weak.

Dorsal spines weak, fitting into a groove; first spine very weak; fourth dorsal spine longest, 2.68 in head; anterior soft rays of dorsal and anal longest; dorsal and anal each with a detached finlet; caudal forked; ventrals small, their tips reaching one-third the distance from base to soft rays of anal.

Color in alcohol, dusky blue on back becoming silvery, tinged with yellow on belly; fins dusky; a dark area at tip of opercle and in axil of pectoral.

We have provisionally identified this species as *D. scombrinus*. It appears to agree very well with Snodgrass and Heller's description of individuals from the Galapagos Islands. The fin counts of our specimen agree more closely with those given in their table of measurements[1] than with those given in the description. We have compared this specimen with an example of *D. sanctaehelenae*, 12¼ inches long, from Easter Island, from which it differs in having the body not tapering so sharply anteriorly and posteriorly; the head longer, snout not so pointed, eye smaller, and the interorbital narrower.

Genus TRACHURUS Rafinesque.

85. TRACHURUS SYMMETRICUS (Ayres).

JUREL; JUREL-CITO.

Plate 5, fig. 2.

Caranx symmetricus Ayres, Proc. California Acad. Sci., vol. 1, 1855, p. 62.
Caranx (*Trachurus*) *cuvieri* Steindachner, Ichth. Beitr., vol. 1, 1875, p. 16; Talcahuano, Callao, Juan Fernandes, Galapagos.
Trachurus picturatus Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 909; not of Bowdich.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 346.—Delfin, Cat. Pisces de Chile, 1901, p. 54.

One specimen, No. 09714, 44 cm. in length, and three specimens, No. 413, 11.3 to 14.2 cm. in length, from Callao, and one specimen, No. 09489, 9.2 cm. in length, and two specimens, No. 09454, 7.3 and 7.7 cm. in length, from Lobos de Afuera.

Head 3.27 in length; depth 4.2; eye 7.1 in head; snout 3.5; maxillary 2.9; interorbital 5.73; pectoral 1.1; D. VIII–I, 33; A. II–I, 28; scutes in curved part of lateral line, 54; in straight part, 47; length of curved part lateral line, 1.06 in straight part.

Body elongate, spindle-shaped (compressed in the young); caudal peduncle very slender, its depth about 2 in eye; head large, snout

[1] Shore Fishes, Galapagos Islands, p. 363.

pointed, lower jaw projecting about two-thirds diameter of pupil beyond upper; eye large, its horizontal diameter nearly as long as snout, longer than interorbital width; mouth large, maxillary reaching vertical from anterior border of eye, posterior edge broad, one-half diameter of eye; teeth small, conical, in a narrow band in each jaw, the bands separated by a short interspace in front of jaws; teeth on vomer, palatines and tongue minute; nostrils small, close together, above and a little in front of eyes; border of preopercle with fine denticulations, vertical border nearly straight, angle rounded.

Spinous dorsal fitting into a groove; third dorsal spine longest, 2.1 in head; anterior rays of dorsal and anal longest; caudal deeply forked; two strong spines before anal, connected by membrane; tips of ventrals reaching halfway from their base to second anal spine; pectoral long, falcate, nearly as long as, or equaling, length of head. Scales small, lateral line armed throughout with plates, those anteriorly crowded, those on straight part each armed with a strong spine; little difference in height of scutes on curved and straight portion of lateral line. Color in alcohol: Back dusky, becoming silvery on sides and belly; ventral surface tinged with yellow; border of opercle above base of pectoral black.

This description is based on a specimen 44 cm. long from Callao.

Measurements of an individual 14.2 cm. in length; head 2.95 in length; depth 3.87; eye 3.45; snout 3.45; maxillary 2.92; interorbital 6.33; pectoral 1.26; scutes 47+47; D. VIII–I, 32; A. II–I, 28.

An examination of individuals in the United States National Museum appears to bear out the statement that the common Mediterranean and North Sea or Atlantic form are distinct; the latter and the Japanese species are similar but distinct from the species found on the Pacific coast of America. In the examples examined it was found that in the Japanese species the scutes were 35 or 36+34 or 35; in an individual from the North Sea 35+36; in the Mediterranean 41 or 42+42; in the species found on the Pacific coast of America 46 to 56+42 to 51.

As the original description of *T. trachurus* was based on specimens from the Mediterranean, it appears that this name should replace *T. mediterraneus*, the common species found there. In that case the North Atlantic form would become *T. semispinosus* (Nilsson) and our Pacific form *T. symmetricus*. A much larger and more widely distributed lot of specimens is needed, as the species appears to be quite variable.

T. symmetricus is found on the west coast of America from California to Chile and the Galapagos Archipelago.

Genus CARANX Lacépède.

KEY TO SPECIES.

a^1. Not more than 25 rays in dorsal and 20 in the anal; D. VIII–I, 23; A. II–I, 20; developed scutes 47 to 50; breast scaly ..... *caballus*, p. 61.

a^2. Dorsal rays more than 25; anal rays more than 20; D. IX–I, 28; A. II, 28 ..... *peruanus*, p. 62.

86. CARANX CABALLUS Günther.

Plate 5, fig. 3.

Trachurus boops Girard, Pacific R. R. Surv., vol. 10, Fish., 1858, p. 108; San Diego; not *Caranx boops* Cuvier and Valenciennes.

Caranx caballus Günther, Fish. Centr. Amer., 1869, p. 431; Panama.—Evermann and Jenkins, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 138; Guaymas.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 922.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 78.

Caranx girardi Steindachner, Ichth. Notizen, vol. 14, 1869, p. 25; San Diego.

Caranx boops Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 261.

One specimen, field No. 09693, 42 cm. long, from Lobos de Tierra, taken with a trolling line along with "Sierras."

Head 3.55 in length; depth 3.55; eye 4.65 in head; snout 3.58; maxillary 2.51; interorbital 3.21; pectoral long, falcate, 2.8 in length; D. VIII–I, 23; A. II–I, 20; scutes 47.

Body elongate, not strongly compressed; arch of dorsal and ventral outline equal; caudal peduncle depressed, its least height about one-half its breadth; head short, snout pointed, upper profile convex; eye large; adipose eyelids well developed; mouth small; jaws equal; maxillary reaching vertical from anterior border of pupil, its greatest breadth equal to diameter of that portion of eye not covered by adipose eyelid; teeth small, villiform, in a narrow band in the upper jaw, outer row slightly larger; in a single row in lower jaw; small teeth on tongue, vomer, and palatines.

Scales small, a small area on cheek and upper part of opercle scaled, rest of head naked; breast scaly; curve of lateral line low, becoming straight under origin of soft dorsal; scutes on caudal peduncle stout, very broad, from below last ray of dorsal to base of caudal, six scutes; pectoral much longer than head, tip reaching to below ninth dorsal ray; ventrals very short, tips reaching halfway from base to first anal spine. Color in alcohol, dusky blue or green on back; belly silvery tinged with golden; a black area on posterior border of opercle above base of pectoral; axil of pectoral black; fins dusky.

This individual agrees very well with an example a foot long from Panama.

This species is found from San Diego to Peru and the Galapagos Archipelago.

87. CARANX PERUANUS Tschudi.

Caranx peruanus TSCHUDI, Fauna Peruana, Ichth., 1845, p. 19.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 346.

A doubtful species; recorded by Tschudi, also by Abbott, from Peru.

Genus VOMER Cuvier and Valenciennes.

88. VOMER SETIPINNIS (Mitchill).

Zeus setipinnis MITCHELL, Trans. Lit. Philos. Soc. New York, 1815, p. 384; New York.

Vomer setipinnis JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 934; vol. 4, 1900, p. 144, fig. 392.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 80.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 786.

Vomer gabonensis ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 347; not of Guichenot.

Genus SELENE Lacépède.

89. SELENE VOMER (Linnaeus).

CABALLITO.

Zeus vomer LINNAEUS, Syst. Nat., ed. 10, 1758, p. 266; America.

Selene vomer EVERMANN and JENKINS, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 138; Guaymas.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 936; vol. 4, 1900, pls. 144, 145, figs. 393, 393*a*.—GILBERT and STARKS, Fishes of Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 82.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 786.

A single small example, field No. 1002, 6.5 cm. in length, from Tumbes, taken with a casting net at the mouth of the Tumbes River. There are 22 dorsal and 19 anal rays; the filamentous dorsal spine is 0.86 total length; ventrals 2.82, filamentous.

Genus TRACHINOTUS Lacépède.

90. TRACHINOTUS PALOMA Jordan and Starks.

PAMPANO.

Plate 6, fig. 1.

Trachinotus paloma JORDAN and STARKS in Jordan, Fishes of Sinaloa, Proc. Cal. Acad. Sci., ser. 2, vol. 5, 1895, p. 437.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 945.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 84.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol .30, 1906, p. 786.

One specimen, field No. 09725, 38 cm. long, from Lobos de Tierra. Head 4.36 in length; depth 2.6; eye 5.66 in head; snout 3.4; maxillary 2.83; pectoral 1.21; D. VII–I, 25; A. II–I, 23.

Body deep, strongly compressed, greatest depth under origin of soft dorsal; dorsal outline strongly and evenly arched; snout bluntish; interorbital high, evenly arched, somewhat compressed; eye small, anterior in position; mouth moderate, nearly horizontal; jaws subequal; maxillary reaching vertical at middle of eye; teeth in lower jaw in a narrow villiform band, those in upper jaw small, confined mainly to a single row; angle of preopercle rounded, with a long downward curve. Scales small, smooth; lateral line nearly straight; head without scales. Dorsal spines short, stout, not connected by membrane; soft dorsal and anal falcate; caudal forked; ventrals small, their tips reach midway from base to origin of anal; pectorals short. Gillrakers slender, 5+12, the last three given in this count are rudimentary, the longest is about half the diameter of the eye.

Color in alcohol: Back dusky bluish; sides and belly silvery, tinged with salmon or yellowish; head and fins tinged with salmon; top of head, dorsal, caudal, and pectorals, dusky.

Cape San Lucas, Mazatlan, southward to Peru.

Family STROMATEIDAE.

THE FIATOLAS.

KEY TO GENERA.

a^1. Ventral fins present in the adult; esophagus with longitudinal plications; lateral line curved anteriorly, becoming straight before reaching the caudal peduncle; body ovate ..... *Leirus*, p. 63.

a^2. Ventral fins absent in the adult; esophagus without longitudinal plications; gill membranes not joined to the isthmus; pelvis not projecting as a spine ..... *Stromateus*, p. 64.

Genus LEIRUS Lowe.

91. LEIRUS PERUANUS (Steindachner).

Centrolophus peruanus Steindachner, Ichth. Beitr. (I), Sitzb. Akad. Wiss. Wien, vol. 69, 1874, p. 10; Callao; Fauna Chilensis, 1898, p. 299.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 347.

Leirus peruanus Fordice, Rev. Amer. Stramateidae, Proc. Acad. Nat. Sci. Phila., 1884, p. 317.—Delfin, Cat. Peces de Chile, 1901, p. 58.

Lirus peruanus Regan, Ann. Mag. Nat. Hist., (7) vol. 10, 1902, p. 200.

Genus STROMATEUS Linnaeus.

92. STROMATEUS MACULATUS Cuvier and Valenciennes.

Stromateus maculatus Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 9, 1833, p. 296 (399); Valparaiso.—Jenyns, Zool. Voy. *Beagle*, Fish., 1839, p. 74.—Gay, Hist. Chile, Zool., vol. 2, p. 248, Atlas Ichth., 1854, pl. 3bis, fig. 1.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 398.—Steindachner, Fauna Chilensis, 1898, p. 299.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 337.—Delfin, Cat. Peces de Chile, 1901, p. 57.—Regan, Fish. Fam. Stromateidae, Ann. Mag. Nat. Hist., ser. 7, vol. 10, 1902, p. 204.

Family CHEILODIPTERIDAE.

THE CARDINAL FISHES.

Genus AMIA Gronow.

93. AMIA RETROSELLA Gill.

Amia retrosella Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 251; Cape San Lucas.

Apogon retrosella Jordan, Fishes of Sinaloa, Proc. California Acad. Sci. 1895, p. 442, pl. 37.—Jordan and Evermann, Fishes of North and Mid. America, vol. 1, 1896, p. 1108.

Four specimens, field No. 09446, 6.8 to 7.6 cm. long, from Lobos de Afuera.

Head 2.4 in length; depth 2.85; eye 3.42 in head; snout 4; maxillary 1.95; interorbital 3.42; D. VI–I, 9; A. II, 8; scales $2\frac{1}{2}$–25 (+4)–9.

Body angular, rather thick anteriorly, somewhat compressed posteriorly; caudal peduncle long, rather broad, its depth 2.5 in head; head large; mouth large, oblique, the maxillary reaching past the vertical from posterior border of pupil; eye very large, its diameter greater than the length of the snout; teeth small, the outer row little enlarged; interorbital broad, flat, equal to diameter of eye; vertical border of preopercle finely serrulate. Spinous dorsal low, second spine longest, 2.75 in head; soft dorsal higher, 1.8 in head; caudal lunate; anal spines weak, the second one-half longest ray; ventrals under pectorals, tips reaching to base of anal; pectorals longer than ventrals, their tips reaching above middle of anal, length 1.6 in head.

Color in alcohol, dusky yellow, everywhere punctulate with brown; a black stripe from eye around snout; spinous dorsal tipped with dusky; a large area on distal part of soft dorsal dusky black; a short black bar from middle of soft dorsal to below lateral line. (The above description is based on the largest specimen.)

Color in life, a bright but thinnish crimson, speckled dusky-like silver showing through a thin crimson film; crimson color and dusky specks show chiefly on posterior margins of scales; silver showing chiefly in centers; less dusky below; a short black bar on upper half

of body, reaching ventrally from beneath middle of second dorsal; spinous dorsal with a rather indefinite black spot on its anterior part; soft dorsal tipped with black anteriorly; caudal sometimes slightly tipped with black; a horizontal black stripe, varying in distinctness in different specimens, passing from eye to eye around end of snout.

A comparison of these specimens with examples of *A. dovii* from Perico Island, Panama Bay, leads us to the same conclusion as that reached by Gilbert and Starks in Fishes of Panama Bay, that the only apparent difference between the two species is one of coloration. These examples of *A. dovii* have a brown area on caudal peduncle; soft dorsal and anal tipped with dusky black; a very indistinct trace of a band across opercles, through eye, around tip of snout.

Family SERRANIDAE.

THE SEA BASSES.

KEY TO GENERA.

a^1. Maxillary with a distinct supplemental bone (rarely obscured by the skin); dorsal usually divided or deeply notched.
  b^1. Inner teeth of jaws not depressible or hinged.
    c^1. Canine teeth more or less developed ..... *Acanthistius*, p. 66.
    c^2. No canine teeth ..... *Hemilutjanus*, p. 67.
  b^2. Inner teeth of jaws depressible or hinged.
    d^1. Parietal crests not produced forward on the frontal. *Epinephelus*, p. 69.
    d^2. Parietal crests produced forward on the frontals.
      e^1. Frontals with a process or knob on each side behind the interorbital area; premaxillaries fitting into a cavity at anterior extremity of frontals; anal rays III, 8, rarely III, 9 ..... *Alphestes*, p. 69.
      e^2. Frontals without processes on the upper surface; parietal crests extending to between orbits; premaxillary processes not extending to the frontals. Anal fin elongate, its rays III, 11 or III, 12, (very rarely III, 9 or III, 10) ..... *Myctoperca*, p. 70.
a^2. Maxillary without supplemental bone.
    f^1. Gillrakers comparatively short and wide apart; lateral line not running close to the back.
      g^1. Dorsal rays XVI, 16; anal rays III, 13; palatine teeth absent ..... *Epelytes*, p. 71.
      g^2. Dorsal rays X, 11 to 15; anal rays usually III, 7.
        h^1. Ventral fins inserted below or more or less behind axil of pectoral; branchiostegals 7.
          i^1. Dorsal fin with 4 or 5 spines produced in long filaments; dorsal rays X, 12; or X, 13; preopercle evenly serrate; preorbital comparatively broad; top of head, cheeks, and preorbital finely and closely scaled to tip of snout; snout long and low, the lower jaw much projecting; caudal lunate; scales rather small; craninum with a large smooth area, much as in *Serranus* and *Prionodes;* body elongate, little compressed; gillrakers few and short. *Cratinus*, p. 72.

i^2. Dorsal without long filamentsous spines, not more than one of its spines specially produced ——— *Paralabrax*, p. 73.

h^2. Ventral fine anterior, inserted more or less in advance of axil of pectoral, well separated; upper half of pectoral fin usually vertically truncate.

j^1. Preopercle with numerous strong diverging spines at its angle, these spines diverging from one or two centers; preorbital broader than maxillary, which is widest near its middle; scales rather large——— *Diplectrum*, p. 75.

j^2. Preopercle simply and rather finely serrate; preorbital narrow ——— *Prionodes*, p. 76.

f^2. Gillrakers (in American species) very long, slender, and close set; lateral line running close to the back.

k^1. Dorsal spines 9, all low, the soft rays about 9. Caudal fin deeply forked, the lobes produced; scales small, ctenoid; ventrals long, inserted behind axil of pectoral; maxillary scaly; frontal region flattish, the supraoccipital crest very prominent *Paranthias*, p. 78.

k^2. Dorsal spines 10 or more; scales not very small; preopercle angular, with salient teeth at its angle; one or more dorsal spines sometimes filamentous; ventral fins long——— *Hemianthias*, p. 79.

Genus ACANTHISTIUS Gill.

94. ACANTHISTIUS PICTUS (Tschudi).

CHERLO.

Plate 6, fig. 2.

Plectropoma pictum Tschudi, Fauna Peruana, Ichth., 1845, p. 5; Coast of Peru and Chile.—Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 164.

Alphestes pictus Jordan and Swain, Proc. U. S. Nat. Mus., vol. 7, 1884, p. 395.

Acanthistius pictus Boulenger, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 140.—Steindachner, Fauna Chilensis, 1898, p. 282.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 348.—Delfin, Cat. Peces de Chile, 1901, p. 60.—Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, p. 26, 1902; Lima, Peru.

Two specimens, field Nos. 09414–15, respectively 22.4 and 19.6 cm. in length, from Guanape North Island.

Head 2.43 in length; depth 2.5; eye 6 in head; snout 3.36; interorbital 7.25; maxillary 2.18; pectoral 1.5; D. XI, 18; A. III, 9; scales 27–135–65.

Body short, compressed, rather deep, dorsal outline strongly arched; depth of caudal peduncle about 3 in head; upper profile of head from tip of snout to base of dorsal, straight or slightly concave; lower jaw slightly projecting; mouth large, protractile; tip of

maxillary reaching to or behind vertical from posterior border of pupil; patches of villiform teeth on jaws, vomer, and palatines; an outer row of enlarged, conical, canine-like teeth in jaws; preopercle strongly serrate; serrations on lower border enlarged, antrorse; head, body, and soft parts of basal portion of fins covered with small ctenoid scales; insertion of dorsal over middle of opercle, third dorsal spine longest, 3 in head; soft dorsal evenly rounded, its height 2.75 in head; caudal rounded; anal elongate, rounded; second anal spine longest, 3.2 in head; tips of ventrals reaching posterior border of vent; pectoral broad, subsymmetrical.

Color in life dark, bronze brown with somewhat obscure mottling of reddish and a lighter color. When specimens are examined more closely, they are found to be variable in coloring. However, the general effect may be described as follows: Showing rather indistinctly through the general body color which is dark brown, appear many very irregular reddish bars and spots, and other bars and spots of a lighter color, generally a sort of bluish gray. Caudal generally distinctly spotted and mottled with bluish gray; the mottling extends onto the soft parts of fins but all the outer parts of soft fins are usually very dark, almost black; skin above maxillary, underneath preopercle, along posterodorsal margin of opercle, and between branchiostegals, a dusky reddish-orange; a dark bar extends obliquely backward across cheek from eye to postero ventral angle of preopercle. This bar, though generally quite evident, is not distinguishable in some large specimens.

Color in alcohol: Body color seal-brown, lighter ventrally; a black bar about one-half diameter of eye in width from side of nostril through center of eye to upper border of opercle; a second from lower border of eye across cheek to angle of preopercle; a third short bar parallel with it on maxillary extending across lower anterior corner of preopercle; a black area between first and second opercular spines; upper border of opercle dusky white; indistinct traces of bars on body; margins of fins very narrowly edged with whitish, easily overlooked; rest of fins body-color.

Genus HEMILUTJANUS Bleeker.

95. HEMILUTJANUS MACROPHTHALMOS (Tschudi).

OJO DE UVA; PAPANOYA.

Plectropoma macrophthalmos TSCHUDI, Fauna Peruana, Ichth., 1845, p. 6; Lurin, Peru.—KNER, Neue Fische aus Mus. Godeffroy, Sitzb. Akad. Wiss. Wien, vol. 56, pt. 1, 1867, p. 711, pl. 1.

Hemilutjanus macrophthalmos JORDAN and EIGENMANN, Rev. Serranidae, Bull. U. S. Fish Comm., vol. 8, 1890, p. 345.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 350.

Pomodon macrophthalmus Boulenger, Cat. Fish. Brit. Mus., vol. 1, ed. 1895, p. 144.—Steindachner, Fauna Chilensis, 1898, p. 281.—Delfin, Cat. Peces de Chile, 1901, p. 60.

Two specimens, field No. 473, 18.8 and 26 cm. in length, from Ballestas Island, region of Pisco, taken with a trammel net fishing in 1 to 3 fathoms; one, field No. 481, 17.8 cm. in length, from Chincha Island, region of Pisco, taken in trammel net; one, field No. 450, 26 cm. in length, from Callao; one, field No. 09720, 27.7 cm. in length, from Mollendo, called "Papanoya," and one, field No. 09555, 35 cm. in length, from Paita.

Head 2.56 in length; depth 2.47; eye 3.8 in head, equal to snout; maxillary 2.2; interorbital 5.5; D. X, 11; A. III, 9; P. 18; C. 19; scales 19–100 (+10)–35.

Body compressed, oblong-ovate; caudal peduncle rather stout, its least depth 2.68 in head; head pointed, lower jaw projecting; maxillary reaching vertical from posterior border of pupil, its greatest width 1.6 in eye; mouth very large, protractile; bands of small villiform teeth on jaws, vomer, and palatines; eye very large, interorbital slightly rounded, 1.33 eye; vertical border of preopercle with small spines on lower portion, becoming smooth on upper portion, lower border and angle with slightly enlarged denticles; first dorsal spine small, 2 in second, which is 1.75 in third; fourth longest, 3 in head; soft dorsal higher than spinous portion, evenly rounded; caudal with its distal border slightly concave; third anal spine longest, 3.33 in head, shorter than the soft rays; ventrals reaching to behind vent, 1.83 in head; pectoral broad, pointed, 1.64 in head.

Scales small, ctenoid, a small area around eye, between eye and snout and on tip of snout, without scales; maxillary covered with small scales, those above lateral line anteriorly, very small, becoming larger below lateral line and on caudal peduncle; dorsal and anal with a scaly sheath at base; caudal finely scaled; pectoral scaled at base.

Color in alcohol, seal-brown on back and sides, lighter on belly; lateral line dark brown, almost black; membranes of rays of dorsal, caudal, anal, and ventrals, dark brown, rays lighter; pectoral yellowish. Description is based on an individual 35 cm. in length from Paita.

Comparative measurements of an individual 27.7 cm. long from Mollendo: Head 2.59 in length; depth 2.45; eye 3.27 in head; snout 3.54; maxillary 1.89; interorbital 5.5; pectoral 1.5; ventral 1.74; D. X, 11; A. III, 9 ($\frac{1}{2}$).

Genus EPINEPHELUS Bloch.

96. EPINEPHELUS LABRIFORMIS (Jenyns).

MURIQUE.

Serranus labriformis JENYNS, Zool. *Beagle*, Fish, 1840, p. 8, pl. 3; Galapagos Islands.

Epinephelus labriformis JORDAN, Fishes of Sinaloa, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 443.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 1155.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 96.—SNODGRASS and HELLER, Shore Fishes of Galapagos Islands, Proc. Washington Acad. Sci., vol. 5, 1905, p. 367.

Two specimens, field Nos. 09450–1, respectively 22.3 and 21.8 cm. in length, from Lobos de Afuera.

Head 2.54 in length; depth 2.92; eye 5.1 in head; snout 4.38; interorbital 7; maxillary 2.2; D. XI, 16½; A. III, 9; scales 11–105–35.

Body elongate, moderately compressed, arched dorsally; head slender, pointed; upper profile comparatively straight; mouth large, lower jaw strongly projecting; maxillary extending beyond the vertical from the posterior border of eye; preopercle finely serrate; opercle with 3 spines, the middle one long and well developed; scales of medium size, ctenoid, some of those above lateral line, anteriorly, unciliated; third to sixth dorsal spines longest, about 3 in head; caudal rounded; ventrals 2 in head, tips reaching beyond the vent; pectoral rounded, barely reaching tips of ventrals.

Ground color in alcohol, dark brown, almost black; a black saddle on caudal peduncle; fins body-color, narrowly margined with yellowish white; distal half of pectoral brownish; slight traces of lightish spots on the belly.

Measurements of the smaller individual: Head 2.43 in length; depth 2.76; eye 5.46 in head; snout 4.12; interorbital 8.25; maxillary 2.20; D. XI, 16½; A. III, 9.

These individuals are much darker than small examples from Panama and the Galapagos Islands and show very little trace of the light markings so characteristic of specimens from those localities.

Genus ALPHESTES Bloch and Schneider.

97. ALPHESTES MULTIGUTTATUS (Günther).

COMPANERO DE MERO; MERO.

Plectropoma multiguttatum GÜNTHER, Proc. Zool. Soc. London, 1866, p. 600; Panama.

Plectropoma afrum GÜNTHER, Fishes Central Amer., Trans. Zool. Soc. London 1869, p. 411, pl. 77, fig. 3.

Alphestes multiguttatus JORDAN and GILBERT, Proc. U. S. Nat. Mus., vol. 5, 1882, p. 375.—JORDAN and EIGENMANN, Bull. U. S. Fish Comm., vol. 8, 1888 (1890), p. 349.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 1165.

Epinephelus multiguttatus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 255.

Two specimens, field Nos. 09476 and 09681, 20.6 and 21 cm. in length, from Lobos de Afuera.

Head 2.55 in length; depth 2.72; eye 5.22 in head; snout 4.75; interorbital 8 in head, 1.62 in eye; maxillary 2.3 in head; D. XI, 18 or 19; A. III, 9; scales 13–75–34.

Body strongly compressed, oblong ovate; caudal peduncle rather slender, its depth 3.5 in length of head; head long and pointed, upper profile comparatively straight; lower jaw projecting; villiform bands of teeth on jaws, vomer and palatines, these very slender and elongate; bands in jaws, narrowing posteriorly to one or two rows; several enlarged caninelike teeth in front of jaws on either side of rami of jaws; preopercle finely serrate, with a strong antrorse spine at angle, and six to eight large spines above it on vertical border; three weak, short opercular spines; fourth dorsal spine longest, 2.3 in head, soft rays higher than spines, the longest 2.25 in head; caudal rounded; tips of dorsal and anal rays reaching past base of dorsal; ventrals 2 in head, their tips reaching to vent; pectorals rounded, 1.55 in head.

Ground color in spirits, brownish, with traces of five or six darker cross-bands; numerous dark, round spots on head, body, and vertical fins; vertical fins and ventrals dusky; pectorals yellowish, crossed by five or six wavy bands of brownish.

In these specimens the snout is a little longer than eye, as stated by Günther, and not equal to or shorter than eye, as stated by Boulenger.

Genus MYCTEROPERCA Gill.

98. MYCTEROPERCA XENARCHA Jordan.

Mycteroperca xenarcha JORDAN, Proc. Acad. Nat. Sci. Phila., 1887, p. 387; James Island, Galapagos.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 348.—SNODGRASS and HELLER, Shore Fishes, Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 368.

Epinephelus xenarchus BOULENGER, Cat. Fish. Brit. Mus., vol. 1, 1895, p. 266.

Rocky Islands of the eastern Pacific from Mazatlan to the coast of Peru; known from numerous specimens in the Museum of Comparative Zoology at Cambridge, from the Galapagos Islands, and from Payta, Peru. (Jordan and Evermann.)

Genus EPELYTES, new genus.

Type of genus.—(*Epelytes punctatus*).

Body oblong, moderately compressed; scales moderate or rather small, ciliate, lateral line complete, parallel with the back, tubes straight and extending along the entire scale; mouth rather small, protractile; maxillary without supplemental bone; lips fleshy, thick; jaws with broad bands of villiform teeth and an outer row of round, pointed canines, larger in front than on the sides of the jaws; a small patch of teeth on the vomer; palatines and tongue naked; preopercle weakly denticulate, these barely showing through the fleshy covering of preopercle; opercle with two short, flat spines; gillrakers few; branchiostegals 6; dorsal continuous, base fleshy, the rays XVI, 16; anal III, 13; caudal truncate or rounded; ventrals slightly behind pectorals, close together, spine small; pectorals rounded.

(ἐπήλυτης = stranger.)

99. EPELYTES PUNCTATUS, new species.

NEGRO.

Plate 6, fig. 3.

Type.—Cat. No. 77688, U. S. Nat. Mus. (field No. 09706), 40 cm. in length, from Mollendo.

Head 3.10 in length; depth 2.88; eye 6 in head; snout 2.55; maxillary 2.80; interorbital 4; D. XVI, 16; A. III, 13; scales 28–90 (+4)–26.

Body oblong, moderately compressed, rather robust anteriorly; caudal peduncle stout, its least depth 2.12 in head; head deep and heavy; eye small, high, 1.5 in interorbital; lips thick and fleshy; mouth small; posterior border of maxillary not reaching vertical from front of eye; maxillary without supplemental bone; bands of villiform teeth in jaws, with an outer row of large, curved, conical canines, those in front of jaws larger than those on sides; a small patch of villiform teeth on vomer, none on palatines and tongue; preopercle with traces of weak denticulations, largely concealed by integument; gillrakers rather short, 8+16, the longest 2.18 in eye.

Scales above lateral line anteriorly small, becoming larger posteriorly and below lateral line; small, elongate, overlapping nonciliated scales on cheeks and opercles; jaws, and top of head anteriorly, without scales; scales on top of head and behind occiput nonciliated, others ciliated; fins scaly. Origin of dorsal in vertical from posterior border of opercle; first dorsal spine very small, concealed by integument, half as long as second, which in turn is about one-half third, first to sixth spines graduated, sixth to sixteenth of

about equal length, about 5 in head; soft dorsal higher, the longest ray about twice longest spine; caudal truncate; anal spines small, graduated, much shorter than soft rays, fin rounded; ventrals inserted slightly behind base of pectorals, their length 1.86 in head; pectoral rounded, middle rays longest, 1.46 in head.

Color in alcohol, brownish olive, almost black in places; body, dorsals, caudal and anal punctulate with small round, dark brown or black spots; head plain.

In general appearance this species bears a strong resemblance to some of the Labrids.

Genus CRATINUS Steindachner.

100. CRATINUS AGASSIZII Steindachner.

PEJE-ZORRO.

Plate 7, fig. 1.

Cratinus agassizii STEINDACHNER, Ichth. Beitr., vol. 7, 1878, p. 19; Galapagos Islands.—JORDAN and EIGENMANN, Rev. Serranidae, Bull. U. S. Fish Com., vol. 3, 1890, p. 394.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 1188.—SNODGRASS and HELLER, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 370.

Serranus agassizii BOULENGER, Cat. Fish. Brit. Mus., ed. 2, vol. 1, 1895, p. 281.

One specimen, field No. 09562, 34 cm. in length, from Paita.

Head 2.70 in length; depth 4; eye 6.7 in head; snout 3.12; interorbital (bone) 1.5 in diameter of eye; maxillary 2.64 in head; D. X, 13; A. III, 7; scales, counting downward and backward from origin of dorsal to lateral line 12, in vertical series 8; tranverse series downward and backward above lateral line 65; vertical series 80 (+5); from base of anal upward and forward 26, in vertical series 18; 58 pores in lateral line; scales strongly ctenoid. Gillrakers rather stout, armed with small spinules, the longest 1.72 in eye, 7+13.

Body elongate, rounded; head long and pointed; eye rather small, about 2.2 in snout, which is long and pointed; interorbital concave; lower jaw projecting; maxillary reaching vertical from middle of eye; a villiform band of teeth in upper jaw, with an outer row of enlarged canine-like teeth and three or four enlarged teeth at symphysis inside the band of villiform teeth; teeth of lower jaw unequal; in front of jaws there is an outer row of slightly enlarged teeth; behind the narrow band of villiform teeth is a similar row, on the sides of the jaw the teeth in this row are much enlarged and the band of villiform teeth outside is very narrow; villiform bands of teeth on vomer and palatines; preopercle armed with small sharp, denticulations.

The first and second dorsal spines are short, the third to sixth are long and filamentous, the third is as long as the head, the fourth is two-thirds as long as the third and slightly longer than fifth; the sixth is one-third of the third; caudal slightly emarginate, the upper rays longer than the lower; anal spines weak, much shorter than the rays; ventrals short, their tips reaching half way from base to third anal ray, 2.20 in head; middle ray of pectoral longest, 1.66 in head, fin rather broad.

Color in alcohol, yellowish brown, darker on back; traces of six or seven dusky cross-bands on sides; fins dusky.

Genus PARALABRAX Girard.

KEY TO SPECIES.

a^1. Dorsal rays 12 or 13; scales 12–77 to 80–25; interorbital 4.40 to 5.00. *humeralis*, p. 73.

a^2. Dorsal rays 14; scales 15–90–32; interorbital 6–6.16 *callaensis*, p. 74.

101. PARALABRAX HUMERALIS (Cuvier and Valenciennes).

CABRILLA; TRAMBOLLO.

Serranus humeralis Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 2, 1828, p. 183 (246); Chile.—Guichenot in Gay, Hist. Nat. Chile, Zool., 1854, p. 149.—Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 24; Callao.

Serranus semifasciatus Gay, Hist. Chile, Zool., vol. 2, 1848, p. 151, Atl. Zool. Ictiol., 1854, pl. 1bis., fig. 2.

Paralabrax humeralis Jordan and Eigenmann, Rev. Serranidae, Bull. U. S. Fish Comm., vol. 8, 1890, p. 389.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 348.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 787.

Two specimens, field Nos. 09142–3, respectively 15.7 and 15.9 cm. long, from Callao, from fish hucksters; one, field No. 09413, 22.8 cm. long, from Guanape North Island; one, field No. 09610, 20.9 cm. long, from Chincha Island; one, field No. 09626, 27 cm. long, from Independencia Bay, Santa Rosa Island, east side; one, field No. 09524, 33.5 cm. long, from Lobos de Tierra; one, field No. 09123, 20.1 cm. long, from Callao, Lima Market, called "Trambollo;" and one, field No. 09715, 37.5 cm. long, from Mollendo.

Head 2.47 to 2.6 in length; depth 3.3 to 3.5; eye 4.8 to 6 in head; snout 3.4 to 4.4; maxillary 2.3 to 2.65; interorbital 4.4 to 5; D. X, 12 or 13; A. III, 7; scales 12–77 to 80 (+5)–25.

Body elongate, moderately arched; head pointed; lower jaw projecting; maxillary reaching vertical from posterior border of pupil; preopercle serrate; opercular spine stout; scales large, strongly ctenoid; spinous dorsal rather high, third dorsal spine longest, 2.35

to 2.85 in head; caudal truncate or slightly lunate; anal spines rather small; ventrals not reaching vent, 1.78 to 1.92; pectoral 1.4 to 1.55 in head, its base 5.5 to 6.

Color in alcohol, dusky olive-brown; fins dusky, pectorals lighter, yellowish; small round light spots on the top and sides of the head and traces of darker cross-bands on body in the young. In some of the specimens there are traces of mottlings on the fins and body and an indistinct trace of a white spot on back between lateral line and base of caudal.

102. PARALABRAX CALLAENSIS Starks.

CASICA; CABRILLA.

Paralabrax callaensis STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 787, pl. 65, fig. 2; Callao, Peru.

One specimen, field No. 09408, 15.8 cm. in length, from Guanape North Island, and one, field No. 09161, 21.5 cm. in length, from Chimbote, from fishermen.

Following are the comparative measurements of these two individuals, those of the larger specimen appearing first: Head 2.3 and 2.35 in length; depth 3.15 and 3.18; eye 4.94 and 4.5 in head; snout 4 and 3.6; maxillary 2.55 and 2.45; interorbital 6.16 and 6; D. X, 14; A. III, 7; scales 15–90 (+5 or 6)–32.

Body compressed, elongate, rather slender; lower jaw strongly projecting; maxillary barely reaching vertical from posterior border of pupil; preopercle armed with small sharp spinules; gillrakers long and slender, 12+22, the longest 1.67 in eye; interorbital narrow, flat; third dorsal spine longest, much longer than first and second, 2.35 in head; caudal truncate; second anal spine stout, longer than the third, 3.5 in head; ventrals barely reaching to vent, 1.9 in head; pectoral broad, breadth of base 3.6 in the length of the fin, which is 1.55 in head.

Color in alcohol: Brownish olive; back and sides of body with irregular, wavy bands of brownish, these become broken below the lateral line posteriorly and on caudal peduncle into irregular oblong or round spots; sides of head with similar bands, these more distinct and sharply defined; fins dusky, base of pectoral with a brownish area and a light slim circular area across base of rays.

In the smaller individual, the bands on the cheeks are replaced by rows of large round dots on a darker band, approaching the coloration of *humeralis;* on the opercle the bands are apparent. Rivulations on sides of body obscured except on basal half of caudal peduncle and caudal fin. The white spot on back between lateral line and base of dorsal is not well marked in these individuals.

This species differs from *P. humeralis* in coloration and in the size of the scales. In individuals of the same size *P. callaensis* has a longer head and slightly deeper body, a much narrower interorbital and one more ray in the soft dorsal.

Genus DIPLECTRUM Holbrook.

103. DIPLECTRUM CONCEPTIONE (Cuvier and Valenciennes).

CAMOTILLA.

Plate 7, fig. 2.

Serranus conceptionis CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 183 (246); Chile.—BOULENGER, Cat. Fish. Brit. Mus., ed. 2, vol. 1, 1895, p. 296.—DELFIN, Cat. Peces de Chile, 1901, p. 63.

?Plectropoma paytensis LESSON, Voy. *Coquille*, Zool., vol. 2, 1830, p. 233; Paita, Peru.

Diplectrum conceptione JORDAN and EIGERMANN, Rev. Serranidae, Bull. U. S. Fish Comm., vol. 8, 1890, p. 399.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 349.

?Hemilutjanus paytensis JORDAN and EIGENMANN, Rev. Serrandiae, Bull. U. S. Fish Comm., vol. 8, 1890, p. 345.

Three specimens, field Nos. 09543, 09547, and 09558, respectively 11.8, 14.2, and 30.1 cm. in length, from Paita. The smaller specimens were taken with a hook and line, a short distance out from the pier. Evidently a very common little fish in this part of the bay. (Coker.)

Two specimens, field Nos. 09529 and 09534, 27.5 and 24.5 cm. in length, from Lobos de Tierra.

Head 2.81 in length; depth 3.67; eye 5.72 in head; snout 3.63; maxillary 2.4; interorbital (bone) 8.42; D. X, 12; A. III, 7; scales 8–60 (+5)–20.

Body compressed; mouth large, oblique; maxillary reaching vertical from middle of eye; lower jaw slightly projecting; eye large, elliptical, high; interorbital slightly concave; snout short and bluntish; preopercle with a well-developed process at angle projecting backward, armed with a series of enlarged denticles; gillrakers elongate, slender, 7+13.

Scales large, ctenoid, those on cheeks in 9 rows; none on top of head and snout; dorsal spines rather slender, fin without distinct notch; caudal nearly truncate, outer rays slightly longer than others; anal spines small, graduated; ventrals short, reaching three-fourths distance to insertion of anal, 1.82 in head; pectorals broad and rounded, 1.45 in head.

Color in life: Back and upper part of sides dark olive green, but with three pale horizontal stripes; one, from just above pectoral to just beneath lateral line on peduncle; a second, from level of eye,

and beginning a short distance posterior to eye, to upper part of peduncle; a third, at a corresponding distance above the second; a darker mottling on the sides gives an indistinct effect of crossbarring, especially on upper part of sides; sides, below lowest stripe, dusky, greenish with much gold; below white with a tinge of orange along median line of belly; head above olive with reddish spots, orange on lower part of sides; under side of opercle with jet black and gold; skin posterior to fourth gill blue-black; caudal mostly reddish orange, ventral margin pale; dorsal light olive with large spots of bright orange; a little black on tips of membrane between dorsal spines; pectorals olivaceous; ventrals mixed dusky olive and orange; anal mostly white, but with some orange on membrane between consecutive rays. (The above description is based on a specimen, No. 09529, 27.5 cm. in length, from Lobos de Tierra.)

Comparative measurements of a specimen No. 09558, 30.1 cm. in length, from Paita: head 2.73 in length; depth 3.95; eye 5.36 in head; snout 3.75; maxillary 2.34; interorbital (bone) 9; pectoral 1.43; ventral 1.67; D. X, 12; A. III, 7.

Color in life of field No. 09543, 11.8 cm. long; back and sides olivaceous, mottled with reddish; rather inconspicuous short orange stripe on posterior ends of premaxillary and maxillary, extending posteriorily and ventrally; region of upper teeth yellow; roof of mouth and floor, (posterior to anterior ventral end of first branchial arch) yellow, sometimes with some black on each side above and below; lining of gill cavity black posteriorly; large bright yellow spot on side, forward of anus and just below mid-line; belly yellow in median line, in posterior half; dorsal translucent, but thinly mottled with olivaceous and orange; membrane just posterior to each spine tipped with reddish orange; a minute black speck on membrane just at tip of each spine; soft dorsal tipped with reddish orange; anal almost entirely yellow; caudal and ventrals dusky olivaceous.

Genus PRIONODES Jenyns.

KEY TO SPECIES.

a^1. Anal rays 7.

b^1. Eye 5.5 in head, shorter than snout; interorbital 6.4; depth of body 3.15; distal half of soft dorsal and outer caudal rays with numerous small jet black spots; caudal, anal, and ventrals mottled ..... *fasciatus*, p. 77.

b^2. Eye 4 in head, equal in length to snout; interorbital 8; depth of body 4; fins without spots or stripes ..... *huascarii*, p. 78.

a^2. Anal rays 9; reddish brown with a pale stripe along lateral line; head, body, and sides silvery, with seven or eight large, round spots; dorsal yellowish, edged with red; caudal brownish; anal reddish brown with two rounded reddish-brown spots ..... *peruanus*, p. 78.

104. PRIONODES FASCIATUS Jenyns.

CARAJO; CARAJITO.

Prionodes fasciatus Jenyns, Zool., Voy. *Beagle*, p. 47, 1842, pl. 9, fig. 1; Chatham Island, Galapagos.—Jordan, Fishes of Sinaloa, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 452.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 1, 1896, p. 1212.—Gilbert and Starks, Fishes Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 98.

Serranus psittacinus Valenciennes, Voy. *Vénus*, Poiss, 1855, p. 299, pl. 1, fig. 1.—Boulenger, Cat. Fish. Brit. Mus., ed. 2, 1895, p. 295.

Two specimens, field Nos. 09682 and 09459, respectively 18.5 and 12.6 cm. in length, from Lobos de Afuera.

Head 2.65 in length; depth 3.15; eye 5.5 in head; snout 3.6; maxillary 2.25; interorbital (bone) 6.4; D. X, 12; A. III, 7; scales 5-48(+5)-15.

Body rather short, compressed, oblong oval; snout pointed, lower jaw projecting; maxillary reaching vertical from middle of orbit; eye moderate, 1.5 in snout; interorbital flattish; a band of villiform teeth in upper jaw, with an outer series of enlarged caninelike teeth, those in front largest, at the symphysis behind the villiform teeth are several similar teeth; two enlarged caninelike teeth in front of lower jaw, behind these a band of villiform teeth, followed by an inner series of enlarged caninelike teeth, which become larger posteriorly, the villiform band narrowing to one or two series; well developed teeth on vomer and palatines; preopercle finely serrate; gillrakers short, 5+9. Scales rather large, strongly ctenoid, those on cheeks small, in about 10 rows; top of head, sides posteriorly to middle of eye, and maxillaries naked.

Dorsal low, fourth spine longest, 3.3 in head; caudal slightly emarginate; tips of soft dorsal and anal rays reaching base of caudal, second anal spine longest, as long as fourth dorsal spine; ventrals inserted in front of pectorals, 1.64 in head; middle rays of pectoral longest, 1.38 in head.

Color in life: Two rows of spots on the sides; the spots of the same row may tend to run together, or the spots of one row may be more or less fused with corresponding spots in the other row; hence some specimens present a sort of transversely barred effect, while others are indistinctly striped.

Much red and orange about lower parts of head. Rows of red spots between the fin rays of the caudal and on the rays of the pectoral.

Ground color in alcohol, olivaceous, sides with about 10 dark crossbands, these disappearing below lateral line and reappearing on level with base of pectoral fin; some scales below base of pectoral, in

front of base of ventrals and on breast, with irregular black areas; head dusky, with trace of black band behind eye; distal half of soft dorsal and outer caudal rays with numerous small jet-black spots; caudal, anal and ventrals with peculiar mottlings; these usually in the form of small ellipses, the outline dusky, margined inside and out with white and usually with a dusky central spot as shown in Jenyns' figure.

105. PRIONODES HUASCARII (Steindachner).

Serranus huascarii STEINDACHNER, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 24, pl. 2, fig. 1; Palta, Peru.

106. PRIONODES PERUANUS (Lesson).

Serranus peruanus LESSON, Voy. *Coquille*, vol. 2, pt. 1, 1828, p. 234; Paita.—JORDAN and EIGENMANN, Rev. Serranidae, Bull. U. S. Fish. Comm., vol. 8, 1888, p. 408 (1890).

From the scant description of this species it is impossible to identify it certainly with any known Serranid from the coast of Peru and we have provisionally placed it here on account of the number of dorsal rays.

Genus PARANTHIAS Guichenot.

107. PARANTHIAS FURCIFER (Cuvier and Valenciennes).

CABINSA.

Serranus furcifer CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 2, 1828, p. 196 (264); Brazil.

Paranthias furcifer JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 1222.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 98.—SNODGRASS and HELLER, Shore Fishes of the Galapagos Islands, Proc. Washington Acad Sci., vol. 6, 1905, p. 372.

One specimen, field No. 09438, 18.8 cm. in length, from Lobos de Afuera.

Head 3.2 in length; depth 2.8; eye 4.53 in head; snout 4.3; maxillary 2.53; interorbital 4.3; D. IX, 19; A. III, 10; scales 12–118–38.

Body slender, strongly compressed, oblong ovate; caudal peduncle 2.6 in head; snout short, maxillary reaching to vertical from middle of eye; narrow bands of villiform teeth on jaws, vomer, and palatines, several caninelike teeth in front of jaws; preopercle finely serrate; gillrakers long and slender, 12+25, the longest 1.9 in eye; scales small, strongly ctenoid; dorsal and anal low, caudal deeply forked; ventrals reaching vent, 1.35 in head; pectoral reaching to or behind tips of ventrals, 1 in head.

Color in life: Back and sides dark olive green, lighter on lower part of sides; ventral part of head, body, and peduncle a thin scarlet,

deeper in places; small spots (about one-half diameter of pupil) irregularly disposed over posterior part of body; most of these spots white, some green; a green spot of same size on the flap just above insertion of pectoral; dorsal tipped with reddish; anal reddish, especially toward tip; caudal narrowly margined all around with reddish; ventral reddish, the exterior margin, including the spine, blue; a very pleasing fish in form and color.

According to fishermen from Pimentel the name of this fish is "Cabinsa," the name applied to this red fish in its northern range, while the gray fish (*Isacia conceptionis*), which bears this name in the south is here called "Chibelico."

Genus HEMIANTHIAS Steindachner.

108. HEMIANTHIAS PERUANUS (Steindachner).

DONCELLA.

Plate 7, fig. 3.

Anthias (*Hemianthias*) *peruanus* STEINDACHNER, Ichth. Beitr., vol. 1, 1874, p. 4; Paita; Trujillo.

Hemianthus peruanus JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 1, 1896, p. 1222.

Pronotogrammus peruanus JORDAN and EIGENMANN, Rev. Serranidae, Bull. U. S. Fish Comm., vol. 8, 1890, p. 413.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 350.

Anthias peruanus DELFIN, Cat. Peces de Chile, 1901, p. 65.

One specimen, field No. 09548, 34.5 cm. in length, from Paita.

Head 2.84 in length; depth 2.95; eye 4.5 in head; snout 4; maxillary 2.53; interorbital 5.4; D. X, 14; A. III, 8; scales 10–55 (+4)–20.

Body compressed, rather deep; caudal peduncle rather stout, its least depth 2.45 in head; mouth very oblique; lower jaw strongly projecting, its upper edge entering into upper profile of head; upper profile of head concave; eye very large, its diameter nearly equal to the length of the snout; maxillary reaching vertical from anterior border of pupil; an outer row of enlarged conical, recurved teeth in upper jaw, back of these a narrow band of villiform teeth, back of this several enlarged caninelike teeth on either side of symphysis; front of lower jaw with 2 large recurved canines, smaller teeth back of these, those on sides of jaw reduced to a single series; vomerine teeth present; a small patch of teeth on the palatines. Gillrakers long and slender, 10+24, the longest 1.37 in eye; vertical border of preopercle slightly concave, finely denticulate, those at angle enlarged, projecting backward in a horny process, denticulations on lower border enlarged.

Dorsal spines slender, the third filamentous, longer than head, 2.5 in length; soft dorsal high, the posterior rays longest, reaching past

base of caudal, twelfth and thirteenth rays longest, 1.7 in head; caudal elongate, filamentous, the middle rays longest, longer than head, 2.20 in length; anal similar to soft dorsal, third anal spine longest, 3 in head; last ray longest, 1.3 in head; ventrals filamentous, reaching to base of soft rays of anal, 2.77 in length of body; pectorals short, middle rays longest, 1.4 in head; scales moderate, somewhat deciduous; top of head, maxillary and preorbital scaleless.

Color in alcohol, yellowish, probably red in life; small brown spots on body above lateral line; a similar row on membranes between rays of soft dorsal; a similar row on caudal rays where these divide, in some cases there are two rows, one following each main division; similar rows on membranes between posterior anal rays.

Family HAEMULIDAE.

THE GRUNTS.

KEY TO GENERA.

a^1. Chin with a central groove behind the symphysis of the lower jaw.
  b^1. Soft dorsal and anal usually with fine scales on the basal part of the membranes.
    c^1. Body ovate, the back elevated; depth greater than length of head; outer teeth of upper jaw enlarged; lips thick; second anal spine very strong, longer and stronger than the third ..... *Anisotremus*, p. 80.
    c^2. Body oblong, the depth usually less than length of head; lips not very thick; scales large, those above lateral line in series mostly parallel with lateral line.
      d^1. Preopercle very sharply serrate, the serrae at angle much enlarged, those below angle turned forward; outer teeth in both jaws considerably enlarged; second anal spine enlarged ..... *Conodon*, p. 82.
      d^2. Preopercle finely serrate, the serrae at angle scarcely enlarged, those below not antrorse; teeth subequal or the outer in upper jaw somewhat enlarged; gillrakers very short and weak; anal spines small or moderate; the second little if any longer or stronger than the third; body oblong, not elevated; scales above the lateral line parallel with the back ..... *Brachydeuterus*, p. 83.
  b^2. Soft parts of dorsal and anal without scales.
    c^1. Anal spines strong, the second much longer and stronger than the third ..... *Pomadasis*, p. 85.
    c^2. Anal spines small, the second shorter or equal in length to the third ..... *Orthopristis*, p. 87.
a^2. Chin with pores but with no central groove at the symphysis; soft rays of dorsal and anal naked or partly scaled; anal fin long, with 10 or 13 rays ..... *Isacia*, p. 89.

Genus ANISOTREMUS Gill.

KEY TO SPECIES.

a^1. D. XI, 14; A. III, 10; scales in lateral line 46 to 48 ..... *pacifici*, p. 81.
a^2. D. XII, 15–17; A. III, 13; scales in lateral line 58 to 62 ..... *scapularis*, p. 81.

109. ANISOTREMUS PACIFICI (Günther).

Conodon pacifici Günther, Proc. Zool. Soc. London, 1864, p. 147; Chiapas.
Anisotremus pacifici Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1316.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 106.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 788; Guayaquil.
Anisotremus (*Paraconodon*) *pacifici* Steindachner, Herpet.-Ichthoyl., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 27.

Pacific coast of Central America; southward to Peru; common at Panama.

110. ANISOTREMUS SCAPULARIS (Tschudi).

CHITA; SARGO; CORCOVADO.

Plate 8, fig. 1.

Pristopomus scapulare Tschudi, Fauna Peruana, Ichth., 1844, p. 12; Huacho.
Anisotremus scapularis Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1320.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 350.—Snodgrass and Heller, Shore Fishes of Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 377.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 788.

One specimen, field No. 09709, 40 cm. long, locally called "sargo," from Mollendo. One specimen, field No. 09574, 23.5 cm. long, from Callao; one specimen, field No. 425, 13.6 cm. long, from near San Lorenzo Island, Callao; one specimen, field No. 476, 22 cm. long from Ballestas Island, region of Pisco, taken with a trammel net in 1 to 3 fathoms; two specimens, field Nos. 09467 and 09470, respectively 23 and 23.5 cm. long, from Lobos de Afuera; one specimen, field No. 09506, 4.8 cm. long, from Lobos de Tierra; and one specimen, field No. 09559, 27 cm. long, locally known as "Corcovado," from Paita.

Head 3 to 3.3 in length; depth 2.1 to 2.45; eye 3.8 to 5.35; snout 2.85 to 3.4; interorbital 2.5 to 3.1; pectoral 1 to 1.1; D. XII, 15–17; A. III, 13; scales 11–58 to 62–20(+3).

An example 40 cm. long from Mollendo had head 3.23 in length; depth 2.4; eye 5.1 in head; snout 3.1; maxillary 3.18; interorbital 2.68; pectoral 1.13; D. XII, 17; A. III, 13; scales 11–60–22.

Body stout, the dorsal outline strongly arched, ventral outline straighter; caudal peduncle rather small, its depth 2.4 in head; head short, profile very steep; snout short and blunt; mouth small, horizontal; maxillary reaching to the vertical from the anterior border

of the eye; teeth in jaws in broad bands, with an outer row of enlarged teeth; vertical border of preopercle very finely serrate; fourth dorsal spine longest, 2.55 in head; caudal forked; second anal spine longest and strongest, 3.3 in head; ventrals moderate, their tips reaching midway from their base to origin of anal rays; pectorals long, falcate, their tips reaching vertical from base of last dorsal spine.

Spinous dorsal fitting into a groove; soft dorsal with a scaly sheath at base; caudal scaled; base of anal with a wide sheath of small scales, smaller scales on membranes; a scaly area at base of pectoral, finer scales reaching out on membranes to near tip of fin; head in front of eye without scales.

Color in alcohol: Dusky gray on back, becoming silvery yellow on belly; fins blackish; opercular margin black; axil and base of pectoral black; axils of ventrals black; a black area on posterior base of soft dorsal and anal.

Color in life: Silver-gray, slightly olivaceous above; fins dark; opercle margined with black; axil of pectoral black; a black bar crossing base of pectoral externally; a black spot at posterior base of dorsal on back and fin, the spots of the two sides being confluent; similar spots confluent around posterior margin of anal.

Doctor Coker writes that this fish is excellent in quality of meat and elegant in appearance. Silver-gray in color, neatly trimmed with black.

A small alcoholic specimen from Lobos de Afuera has the following coloration: Back and sides dusky reddish brown, becoming lighter ventrally; spinous dorsal dusky, soft dorsal blackish distally, with a light area at base of rays; caudal dusky; anterior two-thirds of anal black; a black area on distal third of ventrals; pectorals dusky.

Coasts of Peru, Galapagos Islands, and Cocos Island.

Genus CONODON Cuvier and Valenciennes.

111. CONODON SERRIFER Jordan and Gilbert.

OJO DE UVA.

Plate 8, fig. 2.

Conodon plumieri Streets, Bull. U. S. Nat. Mus., vol. 7, 1877, p. 50; Boca Soledad, west coast of Lower California; not Cuvier and Valenciennes.

Conodon serrifer Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, p. 351; Boca Soledad, Lower California.—Jordan and Evermann, Fish. North and Mid. Amer., vol. 2, 1898, p. 1324.

One example, field No. 331, 26.5 cm. long, from Capon, region of Tumbes.

Head 3.15 in length; depth 3.3; eye 3.75 in head; snout 3.75; maxillary 2.76; interorbital 3.75; pectoral 1.13; D. XI, I, 12; A. III, 7; scales 7–50 (+3)–15.

Body rather elongate, fusiform, little compressed; curvature of dorsal and ventral outlines nearly equal. Head short, broad, interorbital broad and flat, outline from tip of snout to base of dorsal nearly straight; eye very large, equal to snout and interorbital; mouth large, oblique, lower jaw projecting; maxillary reaching to vertical from anterior border of pupil; villiform bands of teeth on jaws, an outer row of enlarged blunt, canine-like teeth in each jaw; preorbital narrow, equal to diameter of pupil; vertical border of preopercle concave, angle acute, ending in a long spine, projecting backward and upward; free margin everywhere armed with strong denticulations; gillrakers slender.

Spinous dorsal triangular, fourth spine longest, 2 in head; soft dorsal low; caudal truncate; second anal spine very long and strong, longer than third; anal spine and rays 2.25 in head; ventrals moderate, tips reaching half-way from base to first soft ray of anal, 1.5 in head; pectoral nearly as long as head, slightly falcate; base of pectoral below level of eye; scales moderate, regular in arrangement, the rows of scales above lateral line parallel with it.

Color in alcohol, brown; silvery reflections on belly, traces of about seven blackish bars on sides.

This individual agrees in all essential characters with the types, U. S. Nat. Mus. No. 17546, of this species. The coloration is much darker and the outer row of teeth larger than in the types, similar to *Conodon nobilis*. This species has been previously recorded only from Lower California.

Genus BRACHYDEUTERUS Gill.

BURRITOS.

KEY TO SPECIES.

a^1. Preorbital narrow, narrower than eye; snout short, 3 in head—*nitidus*, p. 83.
a^2. Preorbital broad, wider than eye; snout long, pointed, 2.4 in head.
leuciscus, p. 84.

112. BRACHYDEUTERUS NITIDUS (Steindachner).

GALLINAZO.

Pristipoma (*Haemulopsis*) *nitidum* STEINDACHNER, Ichth. Notizen, vol. 8, 1869, p. 5, pl. 3, Mazatlan, Mexico.

Pomadasis nitidus JORDAN, Fishes of Sinaloa, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 462.

Brachydeuterus nitidus JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1326.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 109.

Two specimens, field No. 1039, 16.5 and 17.1 cm. long, from Capon (Tumbes).

Head 2.93 in length; depth 2.8 to 2.87; eye 3.52 to 3.91 in head; snout 3.15; maxillary 3.35 to 3.4; interorbital 4 to 4.27; pectoral 1.08 to 1.14; third dorsal spine longest, 1.88 to 2.07; D. XII, 13 to 15; A. III, 8; scales 6 or 7–53 (+2)–11.

Body stout, compressed, back strongly arched; ventral outline less strongly curved than back; head moderate, pointed; mouth small, oblique, maxillary scarcely reaching vertical from front of eye; preorbital two-thirds diameter of eye; eye large, nearly as long as snout, wider than interorbital; preopercle finely serrated; gillrakers long and very slender, 6+13. First dorsal spine very small, third longest; fin not notched; caudal forked; anal spines weak, slender, third longest; ventrals moderate, shorter than pectorals; pectoral nearly as long as head, tip reaching to base of first dorsal ray.

Color in alcohol: Dark silvery brown; centers of scales dusky black, forming lines along the rows of scales, these lines most distinct below lateral line; a large blackish blotch on shoulder at origin of lateral line; opercle blackfish; fins brown.

Gilbert and Starks give the following measurements for four specimens from Panama:

Head 3 to 3.25 in length; snout 3 to 3.25 in head; eye 4 to 4.2; interorbital (bone) 5; scales 48 to 50; dorsal rays 14 or 15; anal rays 8 or 9; upper caudal lobe conspicuously longer than lower lobe.

Gulf of California to Mazatlan, Panama, and southward to Peru.

113. BRACHYDEUTERUS LEUCISCUS (Günther).

RONCADOR; RONCADOR DE AGUA DOLCE.

Pristipoma leuciscus Günther, Proc. Zool. Soc. London, 1864, p. 147; San Jose de Nicaragua, Chiapas.

Pristipoma leuciscus var. *elongatus* Steindachner, Neue und Seltene Fisch-Arten, Denkschr. Akad. Wiss. Wien, vol. 41, 1879, pp. 30, 52, pl. 9, fig. 2; Tumbes.

Brachydeuterus leuciscus Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1327.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 109.

Pomadasis leuciscus Regan, Biologia Centrali-Americana, Fishes, p. 42, 1906 (1906–1908).

One specimen, field No. 1012, 21.5 cm. long, from mouth of Tumbes River, Tumbes, taken with a casting net.

Two specimens, field No. 1028, 12.2 and 13.2 cm. long, from Capon (Tumbes).

Head 2.69 in length; depth 2.96; eye 4.64 in head; snout 2.42; maxillary 3.51; interorbital 4.48; pectoral 1.35; preorbital wider than eye, 4.33; third dorsal spine longest, 2.09; second anal spine longest, 3.82; D. XII, 15; A. III, 8; scales 7–51 (+)–13.

Body moderately elongate, slender, compressed, dorsal outline strongly arched; ventral outline nearly straight; head pointed; snout

long, nearly twice as long as horizontal diameter of eye; interorbital broad, flat or slightly concave; mouth small, lower jaw included; maxillary not reaching ventral from anterior border of eye by a distance equal to pupil; teeth villiform, in broad bands, outer row on upper jaw slightly enlarged; preorbital wider than eye; preopercle strongly and evenly serrate; dorsal spines long, slender, the third longest, the last considerably longer than the one before it; soft dorsal low and evenly arched; caudal lunate; second anal spine a little longer and stronger than the third; ventrals reaching to within two-thirds diameter of eye of vent; pectorals short, their tips reaching to below last dorsal spine; upper caudal lobe longer; scales strongly ctenoid; lateral line strongly arched, parallel with contour of back, becoming straight under posterior third of anal; scales above lateral line parallel with it, regular in their arrangement; preorbital scaled; subopercle scaled; top of snout naked.

Color in alcohol: Silvery brown; a broad silvery lateral stripe, the centers of the scales in this stripe dusky black, forming dark horizontal lines along the rows of scales, these replaced by silvery lines below; a blackish shoulder blotch as in *nitidus* and a dark area on opercle; fins brownish. Description based on a specimen 21.5 cm. long from Tumbes.

The smaller specimens have D. XI, 15 and XII, 14, and are much slenderer in form.

This species ranges from Lower California to Peru; very abundant at Panama.

Genus POMADASIS Lacépède.

THE BURROS.

KEY TO SPECIES.

a^1. Dorsal spines XI or XII; preorbital broad; preopercle serrate; fourth dorsal spine longest 1.9 to 2.25 in head; eye 4 to 4.62 in head.....*schyri*, p. 85.

a^2. Dorsal spines XIII; preorbital narrow; eye large, 3 to 3.5 in head; fourth dorsal spine longest, 1.5 to 1.66 in head.....*branicki*, p. 86.

114. POMADASIS SCHYRI Steindachner.

RONCADOR.

Pomadasys schyri STEINDACHNER, Herpt.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 27, pl. 4, fig. 1; Guayaquil.

One specimen, field No. 1005, 22 cm. long from Tumbes, taken with a casting net at the mouth of the Tumbes River.

Head 2.51 in length; depth 2.62; eye 4.62 in head; snout 3.08; interorbital 4.1 (5.7 bone); maxillary 3.26; pectoral 1.15; D. XII, 13 (½);

A. III, 8; scales 7–44 (+3)–15; first dorsal spine 8.71 in head, second 5.58, third 2.31, fourth 2.06; second anal spine 1.94, third 3.08; ventrals 1.72; gillrakers 6+15, rather short, longest 3.8 in eye.

Body ovate, compressed, dorsal outline strongly arched, ventral outline compartively straight to base of anal. Snout long, pointed, conical; a slight depression over eyes; interorbital broad and flat; mouth small, nearly horizontal, maxillary scarcely reaching vertical from anterior border of eye; teeth in narrow villiform bands; nostrils much nearer eye than tip of snout, the anterior nostril with a large flap, partly covering posterior nostril; preorbital broad, slightly wider than eye; margin of preopercle finely and evenly serrate. First dorsal spine short, slightly more than 1.5 in the second; second about 2.46 in third, which is a little shorter than the fourth; eleventh dorsal spine 1.5 in the twelfth, the latter is considerably shorter than the longest rays; the second anal spine is very long, longer than the soft rays, broad at base and tapering to a point, third anal spine shorter and much weaker; ventrals reaching to within half a diameter of eye from vent; ventral spine strong; pectoral long, tip reaching to vertical from base of second dorsal ray; spinous dorsal fitting into a well-developed sheath of scales, a narrow sheath at base of second dorsal; the sheath at base of anal half as wide as eye.

Color in alcohol, brownish, with traces of silvery; fins dusky.

We have provisionally identified this example as *P. schyri*. From *P. macracanthus*, which it closely resembles, it differs mainly in having a narrower interorbital; and from *P. burro* it differs in having well-developed serrations on the edge of the preopercle; its dorsal spines are longer and the eye is smaller. The type of *P. burro* appears to be an old individual and its dorsal and anal spines are grooved and much worn at the tips. *P. andrei* (Sauvage) from the Guayas River near Guayaquil, Ecuador, is evidently a very closely related form.

115. POMADASIS BRANICKI (Steindachner).

RONCADOR.

Pristipoma branicki Steindachner, Denkschr. Akad. Wiss. Wien, vol. 12, 1879, p. 28; Tumbes, Peru.

Pomadasis branicki Jordan and Fesler, Review Sparoid Fishes America and Europe, Rept. U. S. Fish Comm., 1889–91, p. 493 (1893).—Jordan, Fishes of Sinaloa, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 462.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1333.—Gilbert and Starks, Fishes Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 110.—Regan, Biologia Centrali-Americana, 1906, p. 43 (1906–1908).

One specimen, field No. 1028 (part), 17.7 cm. long, from Capon (Tumbes).

Head 2.77 in length; depth 2.94; eye 3.53 in head; snout 2.79; maxillary 3.53; interorbital 4.07; pectoral 1.18; fourth dorsal spine longest, 1.66; second anal spine 1.66; D. XIII, 12; A. III, 7½; scales 7–44 (+4)–13.

Body elongate, compressed, greatest depth under second dorsal spine; anterior outline of head strongly convex; interorbital broad and flat; snout blunt; mouth small, horizontal; maxillary scarcely reaching vertical from anterior border of eye; preorbital 1.5 in eye; vertical margin of preopercle strongly and coarsely serrate; teeth in narrow villiform bands, broadest anteriorly; scapula serrate; gillrakers slender, 4+11; dorsal and anal each fitting into a narrow scaly sheath. Fourth dorsal spine longest, equal to second anal spine, which is considerably longer than the third; ventrals reaching within one-half diameter of pupil of vent; pectoral longer, reaching to vertical from center of vent.

Color in alcohol, silvery brown.

This well-marked species is easily recognized by the tumid appearance of the snout; the broad, flat, interorbital; the arched profile from the nape to second or third dorsal spine; and the large eye. It occurs on the Pacific coast of tropical America from Mazatlan to Peru.

Genus ORTHOPRISTIS Girard.

THE PIGFISHES.

KEY TO SPECIES.

a^1. Eye 1.75 to 1.9 in snout; origin of dorsal over origin of pectoral; A. III, 11 or 12 ..... *chalceus*, p. 87.

a^2. Eye equal to snout; origin of dorsal somewhat behind origin of pectoral; A. III, 13 ..... *modestus*, p. 88.

116. ORTHOPRISTIS CHALCEUS (Günther).

CORCOVADO.

Pristipoma chalceum GÜNTHER, Proc. Zool. Soc. London, 1864, p. 146; Panama.

Orthopristis chalceus EVERMANN and JENKINS, Proc. U. S. Nat. Mus., vol. 14, 1891, p. 149; Guaymas.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1337.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad Sci., vol. 4, 1904, p. 110.

One specimen, field No. 09724, 35.8 cm. long, from Lobos de Afuera.

Head 2 in length; depth 2.76; eye 5 in head; snout 2.74; maxillary 3.4; preorbital 4.8; interorbital 3.65; pectoral 1.25; D. XI, 16 (½); A. III, 11 (½); scales 12–54 (+)–19; gillrakers, 7+12.

Body ovate, compressed, very deep anteriorly; profile from tip of snout to origin of dorsal nearly straight; snout a little convex, interorbital with a slight concavity and region of nape again slightly convex; greatest height of head nearly equaling its length; eye small, 1.82 in snout, placed close to dorsal profile of head, its horizontal diameter narrower than interorbital and nearly as wide as preorbital; nostrils nearer eye than tip of snout, the anterior elongate, provided with small flap; mouth small, nearly horizontal; maxillary not reaching vertical from anterior border of eye by a distance equal to half diameter of pupil; teeth small, in villiform bands, the outer row in upper jaw a little enlarged; preopercle evenly and finely serrate, the serrae barely showing through the integument. First dorsal spine small, half as long as second, which is 1.5 in third; third nearly equal to fourth, which is longest; dorsal not notched, soft dorsal low; caudal forked, upper lobe longer than lower; second and third anal spines of about equal length, equal to diameter of eye, the second stouter than the third; ventrals reaching to within one diameter of pupil of vent; pectoral nearly reaching vertical from anterior border of vent; base of pectoral under origin of dorsal.

Color shortly after death, dusky silvery with irregular gold stripes, oblique above the lateral line, horizontal below; under side of opercle reddish orange. In alcohol the golden lines along the rows of scales are scarcely discernible; opercular margin dark; general color dusky grayish olive; dorsal and anal dark.

This individual does not differ from examples in the United States National Museum and in the Bureau's reserve series from Guaymas and Panama. The convexity of the snout is more pronounced in the young. Gilbert and Starks in their Fishes of Panama Bay state that the maxillary extends beyond the front of the eye. In none of the specimens examined by us does the maxillary extend beyond the vertical from anterior border of the eye and in large specimens it falls considerably short of reaching the vertical. In other respects our specimen agrees very well with their description of this species.

117. ORTHOPRISTIS MODESTUS (Tschudi).

Haemulon modestum Tschudi, Fauna Peruana, Fishes, 1845, p. 11; Peru.
Orthopristis cantharinus Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 351.

Certain descrepancies in the scant description of this species make it impossible to identify it with any known species. By many it has been considered synonymous with *O. cantharinus* Jenyns, but from the description it seems to us more closely related to *O. chalceus.*

Genus ISACIA Jordan and Fesler.

118. ISACIA CONCEPTIONIS (Cuvier and Valenciennes).

CABINSA.

Pristipoma conceptionis Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 5, 1830, p. 200 (268); Conception de Chile.

Isacia conceptionis Jordan and Fesler, Rep. U. S. Fish Comm., 1888–91, p. 501 (1893).—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 350.—Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 28.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 789, fig. 9.

Isacia venusta Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 789, fig. 10; Callao, Peru.

One specimen, field No. 09625, 25.5 cm. long, from east side Santa Rosa Island, Independencia Bay; one specimen, field No. 503, 29.5 cm. long, from Mollendo; two specimens, field Nos. 09419–20, each 24 cm. long, from Guanape North Island; one specimen, field No. 479, 24 cm. long, from Chincha North Island, region of Pisco, taken abundantly in trammel net; four specimens, field Nos. 09134, 09139–41, respectively 17.7, 16.2, 17, and 15.8 cm. long, from Lina Market, Callao; twelve specimens, field No. 09455, 5.8 to 6.3 cm. long; and two specimens, field No. 09448 (part) each 4 cm. long, from Lobos de Afuera.

A study of these specimens and comparison of them with one of the cotypes of *I. venusta* Starks, seem to indicate that the two species, *I. conceptionis* and *I venusta*, are one. The larger specimens have the smaller eye and the length of the head and depth nearly equal, the head a little the longer of the two; the lower jaw projects more strongly in some specimens than in others and more strongly in the young than in the adult. The relative straightness of the vertical border of the preopercle is variable, in some it is practically straight, in others it is concave, with a long even curve; in still others it is notched near the base.

The table of comparative measurements on the following page will indicate the variability of the species.

Body compressed, dorsal and ventral outline equal and evenly arched; head conical, snout pointed; jaws subequal in the adult, usually the lower a little longer; in the young the projection of the lower jaw is more marked; mouth oblique; maxillary scarcely reaching to the vertical from anterior border of eye; teeth in broad villiform bands, narrowing posteriorly; teeth in the outer row slightly enlarged; vomer and palate without teeth; vertical limb of the preopercle variable from straight to concave or notched; margin dentate, the teeth at angle with wider interspaces; gillrakers long and slender 8+20 to 23; the longest 1.75 in eye.

Scales strongly ctenoid; portion of head in front of eyes naked; soft dorsal naked or with few scales; both dorsals and anal fitting into a groove; caudal scaled; anal with scales on membranes for a short distance; ventrals scaly; pectoral with a scaly area at base.

Dorsals low, third dorsal spine longest, 2.65 in head, anterior rays of soft dorsal longest; caudal forked; anal low, the spines rather

	Mollendo.	Santa Rosa Island.	Guanape North Island.	Guanape North Island.	Chincha North Island.	Callao.	Callao.
Total length	29.5	25.5	24	24	24	17.7	16.2
Head in length	3.1	2.87	3	3	3.2	2.96	2.98
Depth in length	3.12	3.04	3.25	3.36	3.2	3.23	3.19
Eye in head	5.43	4.9	4.6	4.4	4.75	4	4.28
Snout in head	3.28	3.65	3.47	3.88	3.44	3.68	3.34
Interorbital in head	3.28	3.65	3.38	3.67	3.54	4	3.66
Maxillary in head	3.41	3.65	3.61	3.67	3.54	3.68	3.6
Pectoral in head	1.34	1.1	1.12	1.12	1.07	1.01	1.25
Ventrals in head	1.78	1.82	1.78	Ventrals lacking.	1.78	1.6	1.87
Dorsal	XIII, 14	XIII, 14	XIII, 14	XIII, 13	XIII, 15	XIII, 15	XIII, 14
Anal	III, 13	III, 13	III, 13	III, 13	III, 12	III, 12	III, 13
Pores	54	55	55	53	53	54	54
Scales	15–56–17	15–56–17	15–56–17	14–56–17			
Vertical border of preopercle	Nearly straight.	Slightly concave.	Very slightly concave.	Strongly concave.	Nearly straight.	Nearly straight, slight notch near bottom.	Nearly straight.

weak; ventrals moderate; pectoral long and falcate, usually reaching to below origin of soft dorsal.

Color in alcohol, dusky olive, with silvery or yellowish tints on belly and lower part of sides; centers of scales dark, these forming horizontal lines, most distinct ventrally; fins dusky, ventrals blackish; pectoral black in axil on upper base.

Color in life of a specimen from Guanape, sides showing various metallic tints when freshly taken; rather dark above lateral line, nine or more rather indistinct stripes below lateral line.

Field No. 04420 from Guanape is abnormal in that it has no ventral fins. There is no trace of them, indicating that it lacked them at birth.

The young vary some in form and coloration.

A specimen 6 cm. long has head 2.8 in length; depth 3.33; eye 3.75 in head; snout 3.6; maxillary 3.6; interorbital 4.5; pectoral 1.5; D. XIII, 14; A. III, 13; pores 54.

Color in life of small specimens from Lobos de Afuera, dusky olive above, white below; two black stripes on side, the first from upper edge of eye along side of body, the second from middle of eye to base of caudal.

Individuals 4 cm. long have a similar coloration and an elliptical black area at base of caudal.

Family SPARIDAE.

THE PORGIES.

Genus CALAMUS Swainson.

119. CALAMUS TAURINUS (Jenyns).

Chrysophrys taurina Jenyns, Zool., Voy. *Beagle*, Fishes, 1842, p. 56, pl. 12; Galapagos Islands.

Chrysophrys cyanoptera Valenciennes, Voy. *Vénus*, vol. 5, 1846, pl. 4, fig. 2; Charles Island.

Calamus taurinus Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1354; Payta, Peru.—Snodgrass and Heller, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905. p. 379.

Family GERRIDAE.

THE MOJARRAS.

KEY TO GENERA.

a^1. Preopercle entire; second anal spine moderate.....*Xystaema*, p. 91.
a^2. Preopercle serrate; second anal spine much enlarged.....*Gerres*, p. 92.

Genus XYSTAEMA Jordan and Evermann.

120. XYSTAEMA SIMILLIMUM (Regan).

CHAVELA.

Xystaema cinereum Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1373, part.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol .4, 1904, p. 114.—Snodgrass and Heller, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 382.

Gerres simillimus Regan, Biologia Centrali-Americana, Pisces, 1906, p. 38, pl. 8, fig. 2; Rio Presidio, Mexico.

Four specimens, field No. 301, 10.8 to 12.7 cm. long, from Eten, taken in Rio de Eten, about 1 mile from the mouth.

Head 2.9 in length; depth 2.35; eye 3.2 in head; snout 3.2; maxillary 2.9; interorbital 3.2; D. IX, 10; A. III, 8; scales 6–40 (+3)–12; gillrakers short, 4+7.

Body compressed, angular; dorsal outline strongly arched, greatest depth under origin of dorsal; ventral outline in front of anal comparatively straight, base of anal oblique; caudal peduncle slender, its depth a little greater than diameter of eye; snout pointed; interorbital broad and flat, profile from tip of snout to origin of dorsal nearly straight; eye large; mouth moderate; maxillary nearly reaching the vertical from anterior margin of pupil; anterior ventral outline of head slightly concave; no serrations on preopercle and preorbital.

Third dorsal spine longest, 1.88 in head; soft dorsal low; caudal deeply forked, longer than head; second anal spine longer and stronger than the third, 2.13 in head; dorsals and anal inclosed in a scaly sheath; ventrals reaching to posterior border of vent, 1.45 in head; pectorals longer than head, tips reaching vertical from origin of anal, 0.94 in head. Scales large, regular; lateral line parallel with back.

Color in alcohol: Silvery, dusky on back, sides crossed by 7 or 8 broken, dusky, vertical bars; fins dusky; tips of spinous dorsal membranes black. Described from an individual 12. 7 cm. in length from Eten.

Regan states that this species differs from the Atlantic representative (*X. cinerum*) in the fewer scales, larger head, longer maxillary, and longer second anal spine, whilst the bars on the sides are usually more numerous.

Genus GERRES Cuvier.

MOJARRAS.

KEY TO SPECIES.

a^1. Preorbital entire; no distinct dark streaks along the rows of scales. *peruvianus*, p. 92.

a^2. Preorbital serrate; a distinct dark streak along rows of scales on back and sides *periche*, p. 93.

121. GERRES PERUVIANUS Cuvier and Valenciennes.

PERICHE.

Gerres peruvianus Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 6, 1830, p. 467; Paiti (Payta), northern Peru.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1376.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 115.—Starks, Fishes from Eucador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 792.

One specimen, field No. 1040, 10.5 cm. long from Capon.

Head 2.8 in head; depth 1.91; eye 3.33; snout 3.33; maxillary 2.75; interorbital 3.33; pectoral 1; ventral 1.33; D. IX, 10; A. III, 8; scales 6–36–9 or 10.

Body short, compressed, rhomboidal, depth about 2 in length; dorsal outline strongly arched; ventral outline straighter; caudal peduncle slender, its depth 2.5 in head; head short and pointed; interorbital broad, concave, equal in width to diameter of eye and length of snout; mouth moderate: maxillary extending to vertical from anterior border of pupil; preorbital very narrow, without serrations; margin of preopercle with fine, even serrations; pre-

maxillary groove broad, oval; dorsal spines high, slender, fin falcate; dorsal and anal fitting into a scaly sheath; second anal spine longest, 1.5 in head, considerably stronger than the third which is very slender, fin falcate; ventrals reaching midway between vent and origin of anal; pectorals as long as head, reaching vertical from origin of anal.

Color in alcohol: Silvery, fins dusky.

Description based on a small specimen 10.5 cm. in length from Capon.

122. GERRES PERICHE, new species.

PERICHE.

Plate 8, fig. 3.

Head 2.8 in length; depth 2.16; eye 3.97 in head; snout 2.97; maxillary 2.54; interorbital 3.5; pectoral 1.09; D. X, 9; A. III, 8; scales 6– (+3)–11.

Body short, deep, moderately compressed; snout blunt, considerably longer than horizontal diameter of eye; premaxillary groove very broad, without scales; mouth moderate; maxillary reaching vertical from anterior border of pupil; premaxillary groove reaching below middle of eye; teeth small; upper profile of head concave; interorbital broad; cheeks and opercles scaly, the scales on opercles large; several small scales on preopercle; preorbital and preopercle serrated, serrations on the preorbital weak.

Dorsal spines strong, the second longest and strongest, 1.67 in head; no notch between the dorsals, only 8 rays apparent above the broad scaly sheath of the dorsal, the third ray partially aborted; dorsal forked (lobes broken) ; second anal spine long and strong, 2.04 in head, the third longer but much slenderer, 1.98 in head; tips of ventrals reaching midway between vent and origin of anal; ventral spine stout, compressed, knife-like, 2.22 in head; pectorals long, falcate, their tips reaching vertical from origin of anal; scales large, heavy, regular in arrangement; lateral line curved, parallel with dorsal outline; 34 pores on fully developed scales of lateral line, 4 pores on smaller scales at base of caudal; a wide scaly sheath on base of dorsal and anal; the width 2.31 in eye.

Color in alcohol: Silvery, tinged with yellow, a black line along each row of scales above base of pectoral, about 9 of these black lines; no black area in axil of pectoral.

This species resembles *G. lineatus*. From specimens of *G. lineatus* from San Juan Lagoon in the United States National Museum it differs in having a longer head; snout longer than eye; pectoral not as long as head; smaller scales; and the black lines along the rows of scales more pronounced. The back is not quite as strongly arched

but does not present the marked difference stated to exist between *G. lineatus* and *G. brevimanus*.

One specimen, the type, No. 77743, U. S. Nat. Mus. (field No. 1013), 26.5 cm. long, from Tumbes.

Family KYPHOSIDAE.

THE RUDDERFISHES.

Genus DOYDIXODON Valenciennes.

123. DOYDIXODON LAEVIFRONS (Tschudi).

BABUNCO; GALLINAZO.

Pimelepterus laevifrons TSCHUDI, Fauna Peruana, Fishes, 1845, p. 18; Huacho.

Doydixodon fasciatum KNER and STEINDACHNER, Neue Fisch. Mus. Godeffroy, Sitz. Akad. Wiss. Wien, vol. 54, 1866, p. 358, pl. 1, fig. 2; Iquique.

Doydixodon laevifrons JORDAN and FESLER, Rev. Sparidae, Rep. U. S. Fish Comm., 1889–1891 (1893), p. 532.—STEINDACHNER, Fauna Chilensis, 1898, p. 289.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 351; Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 29.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 792, pl. 66, fig. 2.

Two specimens, field Nos. 09718 and 09705, respectively 27 and 31.5 cm. in length, from Mollendo; and one specimen, field No. 09485, 36 cm. in length, from Lobos de Afuera.

Head 3.45 in length; depth 2.42; eye 5.8 in head; snout 2.5; interorbital 2.3; pectoral 1.2; D. XII, 15; A. III, 12; scales 15–55 (+3)–20.

Body deep, ovate, caudal peduncle deep, compressed, depth 2.81 in head; snout blunt, convex; interorbital broad, rounded; eye small, 2.33 in snout, 2.53 in interorbital; teeth small, compressed, those on mandible in five oblique rows, running downward and inward toward the symphysis; a broad band of smaller teeth behind the incisors; gape of mouth reaching nearly to vertical from anterior border of pupil; jaws subequal, the lower slightly included; scales regular in arrangement, those above lateral line anteriorly small, increasing in size posteriorly; a few scales on upper part of opercle; cheek scaled; preopercle, subopercle, and snout naked; soft dorsal falcate, longest ray 1.55 in head; caudal concave, upper lobe longer; distal portion of anal concave, anterior rays longest, 1.33 in head; ventrals not reaching vent, 1.47 in head; pectoral angulated.

Color in alcohol: Back dusky; belly reddish brown; fins dusky. Description of a specimen 36 cm. in length from Lobos de Afuera.

A specimen (field No. 09705) 31.5 cm. in length, from Mollendo, has head 3.14 in length; depth 2.31; eye 5.2 in head; snout 2.51; interorbital 2.43; pectoral 1.2; height of soft dorsal 1.73; height of anal 1.52; D. XII, 16; A. III, 13.

Field No. 09718 has D. XII, 16; A. II, 12.

These individuals present the same differences between this species and *D. freminvillei* from the Galapagos Islands as described and figured by Starks.[1]

Family SCAENIDAE.

THE CROAKERS.

KEY TO GENERA.

a^1. Vertebrae 14 or 15+10 or 11, the abdominal portion of the spinal column having always more vertebrae than the caudal portion.....*Cynoscion*, p. 96.

a^2. Vertebrae 9 to 12+13 to 20, typically 10+14, the number in the abdominal part of the body being always fewer than in the caudal part; dorsal fins contiguous, the soft dorsal being long, much longer than the anal.

b^1. Lower jaw without barbels.

c^1. Mouth more or less oblique; preorbital usually narrow, flat; edge of snout above upper jaw with the pores and slits little conspicuous or obsolete.

d^1. Head not very broad, the interorbital space not notably spongy nor deeply cavernous; preopercle with its membranaceous edge entire, crenulate or ciliate, with no bony teeth; teeth in lower jaw in few series.....*Larimus*, p. 98.

d^2. Head very broad above, the interorbital space flattish, excessively cavernous, the septa reduced to thin partitions; soft dorsal and anal fins usually densely scaly.....*Stellifer*, p. 99.

c^2. Mouth more or less inferior; snout above lower jaw with large pores and with two more or less distinct slits on its edge; preorbital more or less broad; preopercle without bony serrations, its membranaceous edge entire or crenate or fringed.....*Sciaena*, p. 101.

b^2. Lower jaw with one or more barbels, either at the symphysis or on the rami; snout with slits and pores as in *Sciaena;* lower jaw included; preorbital broad; lower teeth in villiform bands.

c^1. Pseudobranchiae well developed; pectoral fin not elongate. Lower jaw with a single thickish barbel at its tip.

d^1. Air bladder large; anal spines 2; back more or less elevated; preopercle with its bony margin crenate or serrate; pectorals short, shorter than ventrals.....*Umbrina*, p. 105.

d^2. Air bladder none; anal spine single, weak; back not elevated; preopercle with its membranaceous edge crenulate; pectoral fins usually long, longer than ventrals.....*Menticirrhus*, p. 106.

c^2. Pseudobranchiae weak or obsolete; if present, covered by membrane; pectoral fin elongate; mandible with a row of slender barbels along its inner edge, and tuft of barbels at chin.....*Polyclemus*, p. 108.

[1] Fishes from Ecuador and Peru, p. 792, pl. 66, figs. 1 and 2.

Genus CYNOSCION Gill.

KEY TO SPECIES.

a^1. Anal with more than 12 soft rays_____*analis*, p. 96.
a^2. Anal with fewer than 12 soft rays.
b^1. Scales not very small, the number of transverse series ranging from 55 to 75, being not much in excess of the number of pores; pectoral fins short, reaching little past middle of ventrals, their length not more than one-half head; scales smaller (10—73—10), 60 pores in the lateral line_____*stolzmanni*, p. 97.
b^2. Scales comparatively small, the number of transverse rows ranging from 85 to 90, usually about 80 pores in the lateral line__*phosocephalus*, p. 97.

124. CYNOSCION ANALIS (Jenyns).

Otolithus analis JENYNS, Zool. Voy. *Beagle*, Fishes, 1842, p. 164; Callao.
Otolithus peruanus TSCHUDI, Fauna Peruana, Ichthy., 1845, p. 10; Coast of Peru.
Ancylodon altipinnis STEINDACHNER, Ichth. Notizen, vol. 3, 1866, p. 2, pl. 1, fig. 3; west coast of South America.
Archoscion analis JORDAN and EIGENMANN, Rep. U. S. Fish Comm., 1886 (1889), p. 353; Callao.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 352.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 793.
Archoscion altipinnis ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 353.
Archoscion peruanus ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 353.
Isopisthus analis STEINDACHNER, Herpet-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 31; Paita.

The validity of *Cynoscion altipinnis* (Steindachner), and *Cynoscion peruanus* (Tschudi), seems very questionable and we follow Jordan and Eigenmann in placing them in the synonymy of this species. Steindachner's original description of *C. altipinnis* is based on a specimen 17.8 cm. (7″) long, considerably smaller than those described by Abbott, and as he himself states "the most important difference (between the two) seems to lie in the lack of developed opercular spines in *analis*, while the other species (*altipinnis*) has two quite strong spines." Steindachner[1] calls attention to the fact that in a specimen of *analis* 21 cm. long the eye is 5 in head and in individuals 32 cm. long it is contained 6 times. He also includes *Archoscion analis* of Jordan and Eigenmann in his synonymy, which by Abbott has been included in the synonymy of *altipinnis*, originally described by Steindachner and later placed by him in synonymy of *analis*. Tschudi's description of *peruanus* is based on a large individual (1′ 3″) and agrees closely with the descriptions of *analis*.

[1] Herpet.-ichthyol. Südamerika.

125. CYNOSCION STOLZMANNI (Steindachner).

Otolithus stolzmanni STEINDACHNER, Neue und Seltene Fische Arten k.k. Zool. Mus., Denkschr. Akad. Wiss. Wien, vol. 41, 1879, p. 35, pl. 2, fig. 1; Tumbes, Peru.

Cynoscion stolzmanni JORDAN and GILBERT, Bull. U. S. Fish Comm., 1881, p. 320.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1412.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 354.

126. CYNOSCION PHOXOCEPHALUS Jordan and Gilbert.

Cynoscion phoxocephalum JORDAN and GILBERT, Bull. U. S. Fish Comm., 1881, p. 318; Panama.

Cynoscion phoxocephalus JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1413.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 120.

One example, field No. 1036, 29.5 cm. long, from Capon, near Tumbes.

Head 3 in length; depth 4.46; eye 6.46 in head; snout 4; maxillary 2.4; interorbital 4.93; pectoral 2; D. IX–I, 21; A. III, 10; scales 18–90–15, pores about 60. Body moderately elongate fusiform; head conical, little compressed, profile from tip of lower jaw to origin of dorsal nearly straight; mouth large, oblique, maxillary reaching to below posterior border of orbit; teeth differing in no essential characters from those of other species of *Cynoscion;* as stated by Gilbert and Starks, "the premaxillary teeth are in a band throughout, which contain everywhere more than two series. Along the sides of the jaw the outer series consists of stronger conical teeth which are scarcely larger than those behind them. Anteriorly the band widens and bears along its posterior edge a converging pair of small canines. The mandibular band is widest near the symphysis, where it consists of three series, those of the outer series somewhat stronger than the others. Laterally the band rapidly narrows, at first to two series, the inner of strong conical teeth, the outer very small; then the outer series disappears, those of the remaining series increasing in size toward the angle of the mouth."

Dorsal fins separate, the spines of the first dorsal slender, the third and fourth longest, reaching nearly to tip of last spine; second dorsal rather low, scaleless; anal moderate, the spines small; ventrals short, 2 in head; pectorals rather narrow, equal to ventrals. Scales small, regular in arrangement, transverse rows above lateral line very oblique; scales on cheek large, imbedded, covered with a transparent skinlike covering, those on top of head small, crowded; lateral line with a very slight arch anteriorly, becoming straight above vent, scales enlarged but covered with smaller scales.

Color in alcohol: Silvery brown; fins brownish; inside of opercle black; a blackish humeral area concealed by gillcover.

Jordan and Evermann give the following colors in life: Dark above with strong bright reflections of purplish-brown; silvery below, the lower part of the caudal peduncle golden yellow; middle of sides noticeably punctulate with brown dots; inside of mouth deep orange-yellow; lining of opercle black; dorsal and caudal fins dusky whitish, with more or less dark edging; lower rays of caudal yellowish; fins otherwise translucent, unmarked; axil of pectoral light yellowish above; the silvery color of the sides of the head and the bright reflections on its upper surface very conspicuous, more so than in any other species of the genus.

Length 2 feet; a neat and well-marked species. Pacific coast from Panama to Peru; previously recorded only from Bay of Panama where it is abundant.

Genus LARIMUS Cuvier and Valenciennes.

127. LARIMUS PACIFICUS Jordan and Bollman.

BERECHE.

Plate 9, fig. 1.

Larimus pacificus Jordan and Bollman, Proc. U. S. Nat Mus., vol. 12, 1899, p. 161; Pacific Ocean, off coast of Colombia, at Albatross Station 2802, 8° 28′ N.; 79° 31′ 30″ W., between Galapagos Islands and Panama.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p 1424.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 124.

One specimen, field No. 09525, 25 cm. long, from Lobos de Tierra; and one, field No. 09127, 17.3 cm. long, from Callao.

Head 2.98 in length; depth 3.15; horizontal diameter of eye 4.75 in head; snout 4.15; maxillary 2.12; interorbital 3.88; pectoral 1.14; D. X–I, 27 (½); A. II, 6 (½); scales 7–44 (+5)–10; gillrakers 10+20, long, slender, equal to diameter of eye.

Body compressed, slender, not so heavy forward as in related species; back regularly rounded from snout to last dorsal rays; belly evenly arched anteriorly, base of anal very oblique, caudal peduncle slender; snout short, mouth rather large, oblique, the maxillary reaching to below posterior border of pupil; lower jaw projecting; eye moderate; scales large, regular, those on body including breast, ctenoid; those on head, cycloid; base of soft dorsal and anal with a scaly sheath; membranes scaly; dorsal high, first spine very small, almost concealed by skin, the fourth largest, 2.1 in head; second dorsal moderate; caudal with middle rays longest, lanceolate in shape; anal small, first spine very small, the second shorter than soft rays, 3.8 in head; ventrals short, 1.65 in head, not reaching to tip of pectoral.

Coloration in alcohol: Back dusky; sides yellowish; centers of scales dusky, forming dusky stripes along rows of scales, those above lateral line parallel with it to below origin of soft dorsal where they turn obliquely upward, those nearest back being the first to turn upward and those on caudal peduncle again following rows of scales parallel with lateral line, those below lateral line slightly wavy, horizontal, these becoming silvery on belly; fins dusky yellow; axil of pectoral black; skin lining region around pseudobranchiae black, this showing through opercle as a dark area.

This species has the general color pattern of *L. acclivis*, differing in having the dark streaks above lateral line anteriorly parallel with it instead of oblique. This description is based on a specimen 25 cm. long from Lobos de Tierra.

The individual from Callao has head 2.98 in length; depth 3.1; eye 4.15 in head; snout 4.18; maxillary 2.18; interorbital 3.55 pectoral 1.2; D. X–I, 27; A. II, 6 ($\frac{1}{2}$).

Genus STELLIFER (Cuvier) Oken.

128. STELLIFER MINOR (Tschudi).

MOJARILLA.

Plate 9, fig. 2.

Corvina minor Tschudi, Fauna Peruana, Ichth., 1845, p. 9; Coast of Peru, Lima market.

Sciaena minor Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 295.

Corvina (Homoprion) agassizii Steindachner, Ichthy. Beitr., vol. 2, p. 26, Sitz. Akad. Wiss. Wien, vol. 71, 1875; Callao.

Corvina agassizii Cope, Proc. Amer. Philos. Soc., May, 1877, p. 42; Pacasmayo and Chimbote bays.

Stelliferus minor Jordan and Eigenmann, Rev. Sciaenidae, Rep. U. S. Fish Comm., 1886 (1899), p. 393.

Stellifer minor Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 354.—Starks, Fishes from Eucador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 793.

Stellifer agassizii Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci., Phila., 1899, p. 355.

One specimen, field No. 09427, 15.9 cm. long, from Pacasmayo, taken with hook and line from the pier, and one, field No. 09170, 15 cm. long, from Chimbote.

Head 3.16 in length; depth 2.8; eye 5.1 in head; snout 4; interorbital 2.8; maxillary 2.5; pectoral 1.05; D. XIV, 20; A. II, 11; scales 8–53–14.

Body compressed, dorsal outline more strongly curved than ventral; head broad, cavernous, region over eye somewhat depressed; snout bluntly rounded, scarcely overlapping the premaxillaries; mouth moderate, oblique; maxillary reaching to below middle of

pupil; teeth in lower jaw in a villiform band, those on premaxillaries similar, but with an outer row of enlarged, curved caninelike teeth, these decreasing in size toward angles of mouth; vertical limb of preopercle with 5 moderate spines, the lowermost strong, directed downward; several spines on the horizontal limb of the preopercle, these projecting but little below the integument; nostrils rather small, the posterior close to orbit; gillrakers very long and slender, 6+24, the longest at angle of arch, 1.23 in eye.

First dorsal spine very small, the fourth longest, 2.1 in head; fourth to tenth growing shorter, eleventh to fourteenth again increasing in length; all the spines rather weak; caudal subtruncate; second anal spine considerably longer than first but shorter than soft rays, 3 in head; ventrals not reaching vent, 1.4; pectoral long, reaching to below origin of soft dorsal. Scales on body ctenoid, those on head weakly ctenoid; soft parts of vertical fins scaled to their tips. In life, this specimen was much darker and the stripes more distinct than in individuals from Chimbote. Ground color light, with dark stripes along rows of scales; 11 stripes distinguishable below the lateral line, seven above the pectoral; white of belly extending up on lower part of sides for only one-fourth inch; all fins rather dusky with only faint traces of yellowish orange; faint reddish orange on ventrals.

Color in spirits: Back very dark, sides lighter, becoming white on ventral surface; centers of scales dark, these forming lines along rows of scales; center of opercle with a dusky black area; vertical fins dusky; paired fins lighter; base of pectoral dusky. Description based on a specimen 15.9 cm. long from Pacasmayo.

An individual from Chimbote has head 3.02 in length; depth 2.75; eye 5 in head; snout 3.8; maxillary 2.47; interorbital 3; pectoral 1.35; D. XIII, 20; A. II, 11. Color in life: There is some variation in the coloration of this species, but a fish of ordinary markings has the following coloration: Ground color light, especially below; belly and lower part of sides for three-fourths of an inch or more, white; inconspicuous stripes (6+) below the lateral line, five of these being above the pectoral; other stripes above the lateral line, but they are seen very indistinctly in the darker coloring of the upper part of body. Fins (anal, pectoral, and caudal) yellowish orange, somewhat dusky, pectoral with some reddish orange; ventrals reddish orange with hardly any duskiness.

We are unable to find sufficient differences between *Corvina agassizii* of Steindachner and *Corvina minor* of Tschudi to separate the two and believe that they are one.

This species is found along the coast of Peru, and is most nearly related to *Stellifer illecebrosus* Gilbert, from Panama Bay.

Genus SCIAENA (Artedi) Linnaeus.

THE BLACK DRUMS.

KEY TO SPECIES.

a^1. Transverse rows of scales above lateral line 50 to 55; head 2.75 to 3 in length.
  b^1. D. IX or X, I, 25; scales 13–53–20; opercle ending in broad, truncate, centrarchid-like flaps; eye 4.5 to 5.25 in head ..... *fasciata*, p. 101.
  b^2. D. IX or X, I, 22 or 23; scales 7–53–12; eye 5.5 to 6 in head. *deliciosa*, p. 102.
a^2. Transverse rows of scales above lateral line 60 to 85; head 3.2 to 3.4 in length.
  c^1. Eye moderate, 5.5 to 6.25 in head; scales 11–60–15 ..... *gilberti*, p. 103.
  c^2. Eye small, 7.5 to 11 in head; transverse rows of scales above lateral line more than 65.
    d^1. Eye very small, 9.5 to 11 in head, 3 in snout; depth less than length of head; transverse rows of scales above lateral line 68 *starksi*, p. 104.
    d^2. Eye larger, 7.5 in head, 2 in snout; depth equal to length of head; rows of scales in lateral line (reported) 85 ..... *weineri*, p. 105.

129. SCIAENA FASCIATA (Tschudi).

GALLINAZO.

Cheilotrema fasciatum TSCHUDI, Fauna Peruana, Ichth., 1845, p. 13, pl. 1; Caleta of Chancay, between Callao and Huacho.

Corvina fasciata GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 305.—STEINDACHNER, Ichth. Notizen, vol. 7, 1868, p. 21.

Sciaena fasciata JORDAN and EIGENMANN, Review of Sciaenidae, Rep. U. S. Fish Comm., 1886 (1889), pp. 403, 407.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 356.—DELFIN, Cat. Peces de Chile, 1901, p. 69.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 793.

One example, field No. 09164, 27.5 cm. long, from Chimbote.

Head, including flap, 3 in length; depth 2.6; eye 5.2 in head; snout 3.7; maxillary 3.12; interorbital 3.2; width of broad centrarchid-like opercular flap above opercular base 3; pectoral 1.56; ventrals 1.47; D. IX, I, 25; A. II, 9; P. 18; scales 13–53–20, those above lateral line in very oblique rows.

Body short, deep, the back elevated, anterior profile very steep and rounded; head high, ending in a broad, truncate opercular flap; snout short, blunt, very high, projecting slightly beyond tip of mandible; eye small, less than interorbital width, 1.4 in snout; mouth small, inferior, slightly oblique; maxillary reaching to below middle of pupil; lips papillose; teeth in broad bands in each jaw, the outer row on the premaxillaries somewhat enlarged; vertical border of preopercle nearly smooth, a few small fleshy serrations present; gill-rakers very short and stout, armed with small spine-like prickles, 4+8, the last rudimentary.

Scales on head and body strongly ctenoid, the transverse rows on body very oblique; membranes of soft-rayed fins densely scaly to

their tips; tip of snout and area around mouth naked; fourth dorsal spine longest, 2.6 in head; soft dorsal evenly rounded; posterior border of caudal truncate: first anal spine very short, second anal spine stout, shorter than soft rays, 3.25 in head; ventrals longer than pectorals, reaching about two-thirds the distance from their base to vent; pectoral short.

Color in alcohol: Dusky gray, lower parts silvery; a conspicuous light band equal in width to orbit, extending downward and backward from below last dorsal spine to in front of the vent; another irregular light area under middle of soft dorsal; fins dusky gray, tips of anal and ventrals darker; base of pectoral black, opercle ending in a broad truncate, jet black opercular flap.

In the figure of this species as given by Tschudi, the opercular flap is not distinctive, although he mentions the characters of this flap in his description.

This remarkable species is found on the coasts of Peru and Chile; not common.

130. SCIAENA DELICIOSA (Tschudi).

LORNA: CHOLO.

Plate 9, fig. 3.

Corvina deliciosa Tschudi, Fauna Peruana, Ichth., 1845, p. 8; Peru.

Sciaena deliciosa Jordan and Eigenmann, Rev. Sciaenidae, Rept. U. S. Fish Comm., 1886 (1889), pp. 401, 406.—Jordan and Evermann, Fishes of North and Mid. Amer., vol. 2, 1898, p. 1455.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 356.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 132.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 794.

Two examples, field Nos. 09135 and 09138, respectively 21 and 22.5 cm. long., from Callao (Lima Market), and one, field No. 517, 22 cm. long, from Mollendo.

Head 2.9 in length; depth 3.4; eye 6 in head; snout 4; interorbital 3.8; maxillary 2.93; pectoral 1.34; D. X, I, 20; A. II, 9; scale 7–51–12, 50 pores in lateral line to base of caudal.

Body compressed, dorsal outline forming a regular curve from tip of snout to base of caudal; ventral outline straighter; head compressed; interorbital rounded; snout rather blunt, slightly projecting beyond tip of mandible; slits and pores on tip of snout well developed; anterior nostril round, midway between tip of snout and anterior border of orbit; posterior nostril an elongate slit; eye rather small, considerably less than interorbital space, the latter equaling snout; maxillary reaching to below middle of pupil (in some specimens to below its posterior border); mouth rather large, oblique, the lower jaw slightly included; preopercle finely and

evenly serrate on its vertical border, the serrations at angle on horizontal border somewhat enlarged; teeth in villiform bands, unequal, an outer row on the premaxillary somewhat enlarged; gillrakers small, slender, 6+14, the longest at angle equal to diameter of pupil.

Scales regular, slightly deciduous; soft dorsal and anal scaled at base only, the scales extending but a short distance on the membranes.

Dorsal spines moderate, the 4th longest, 2.74 in head; soft dorsal low, rays graduated; caudal lunate, upper lobe longer; first anal spine very small, second slender, 3.5, much shorter than soft rays; ventrals short, reaching one-half distance from their base to posterior border of vent; pectoral reaching to below origin of soft dorsal.

Color in alcohol, dusky on back and sides, becoming silvery on belly; faint dark lines following rows of scales; a dark area on opercle; fins dusky; axil of pectoral blackish. Description based on a specimen 22.5 cm. long from Callao.

An example from Mollendo has 23 dorsal rays and the belly and sides strongly silvery.

This species does not attain as large a size as some of the other important food fishes of the genus, but it is one of the most abundant and highly prized food fishes on the coast of Peru. It is abundant at Callao and has been recorded as far north as Panama.

131. SCIAENA GILBERTI Abbott.

CORBINA: CORBINITA.

Plate 10, fig. 1.

Sciaena gilberti Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 355; Callao.—Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 32; Callao.

Three specimens, field Nos. 09727 (=09102), 09104 and 09111, respectively 33, 28.5, and 38 cm. long, from Callao, taken with gillnet, fishing in the surf at La Ventanilla, between Ancon and Callao.

Head 3.3 in length; depth 3.52; eye 6 in head; snout 3.16; maxillary 2.54; interorbital 4; D. IX–I, 23; A. II, 9; scales 11–60 (+5)–14, 60 pores.

Body elongate, fusiform, back little elevated; curvature of dorsal and ventral outlines similar; head not elevated; snout rather long and sharply pointed, not projecting beyond mandible; mouth large, oblique; maxillary extending to below middle of pupil; posterior nasal slit shorter and larger than usual in related species; free margin of preopercle armed with small, equal serrae, these weak and rather flexible; teeth in jaws in two or three rows, the outer row slightly enlarged; third dorsal spine longest, 2.18 in head, outline of fin triangular; soft dorsal highest anteriorly; caudal lunate; first anal spine very small, the second slender, about 1.75 in longest anal ray,

3.61 in head; ventrals placed well forward, their tips reaching halfway from base of ventrals to posterior end of vent; pectoral longer than ventrals, 1.5 in head; scales ctenoid, those on head and body anteriorly small, crowded, those under base of last dorsal rays much larger; transverse rows anteriorly very oblique; a small area on tip of snout and mandible, anteriorly without scales; lateral line curved anteriorly, following outline of back, becoming straight above middle of anal; gillrakers long, 9+15.

Color in alcohol: Olivaceous; a narrow central streak on each scale of lighter olive, these forming rows following the rows of scales; fins somewhat dusky; a dark area on opercle. Description based on a specimen 33 cm. long from Callao.

In other specimens the head is 3.2 to 3.31 in length; depth 3.28 to 3.62; eye 5.5 to 6.12 in head; snout 3.8; maxillary 2.56 to 2.6; interorbital 3.82 to 4.1; preorbital 8.8 to 9; pectoral 1.5; ventral 1.9 to 1.97; third dorsal spine longest, 2.2 to 2.5; second anal spine 3.15 to 3.6; gillrakers 9+15, the longest 1.92 in eye; D. IX–I, 23; A. II, 9 or 10. In these specimens the general color is rufous brown, dusky on back.

Dr. Robert E. Coker writes that this fish grows to a large size, 30 to 40 pounds, and is one of the most highly prized food fishes of Peru. It is present all the year in the region about Callao, but more abundant in the summer.

132. SCIAENA STARKSI, new name.

ROBALO; ROBALITO.

Sciaena gilberti STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 794, pl. 66, fig. 3; Callao; name preoccupied.

Two specimens, field Nos. 09732 (=09100) and 09731 (=09101), each 47 cm. long, from Callao.

Starks, in his Fishes from Ecuador and Peru,[1] describes and figures this species and gives it the name *S. gilberti.* Abbott, in his Marine Fishes of Peru,[2] also described a new species from Callao to which he gave the name *S. gilberti.* As Abbott's use of the name has priority over its use by Starks, we propose the name *S. starksi* for the species described by the latter.

Head 3.36 in length; depth 4; eye 10.6 in head; snout 3.6; maxillary 2.42; interorbital 3.3; preorbital 14.8; pectoral equal to ventrals, 1.98; D. X, I, 22 ($\frac{1}{2}$) to 23 ($\frac{1}{2}$); A. II, 10; scales 10–68–16.

Body compressed, long, slender, spindle-shaped; head slender, depressed, the interorbital space very broad, 3.2 times horizontal diameter of eye, which is very small, 9.5 to 11 in head, 3 in snout; mouth large, oblique, the lower jaw slightly included; maxillary

[1] Proc. U. S. Nat. Mus., vol. 30, 1906, p. 794.
[2] Proc. Acad. Nat. Sci. Phila. 1899, p. 355.

reaching a little past posterior border of eye (the statement by Starks that it reaches a little past anterior border of eye, is undoubtedly a misprint, as in his figure and our specimens it reaches slightly past the vertical from posterior border of eye); teeth in upper jaw in two or three irregular rows, the outer of these much enlarged, those on lower jaw in two rows, the inner being the larger; gillrakers 4+10, covered with spinules, the longest nearly equal to horizontal diameter of eye; entire margin of preopercle with small, rather widely separated, denticulations; third and fourth dorsal spines about equal, longer than the others, 2.7 in head; soft dorsal rather low, highest anteriorly; caudal lunate; anal spines small, the second 4 in longest ray; pectorals and ventrals short. Scales ctenoid; dorsal and anal with scaly sheath; caudal scaled two-thirds way to its tip; a small area at base of pectoral scaled; head scaly except tip of snout, maxillary and mandibles.

Ground color in spirits: Olivaceous, dusky on back; scales crossed by a dark line, these forming lines following the rows of scales; dorsals, caudal, and pectorals dusky; anal and ventrals lighter; axil of pectoral dusky; a dusky area showing through opercle.

Starks states that this species differs from *S. wieneri* Sauvage "in having the length of the head greater than the depth and longer as compared with the entire length; the snout shorter as compared with the interorbital space; the eye smaller; the caudal lunate; and the scales larger."

Dr. R. E. Coker states that of the three species "lorna" (*S. deliciosa*), "corbina" (*S. gilberti*), and "robalo" (*S. starksi*), the "corbina" is much the best food fish. The "robalo" reaches a larger size, 30 to 40 pounds or larger. It is more abundant in summer and is usually fished near the bottom, sometimes at a depth of 15 to 20 fathoms, although it is occasionally taken at the surface.

133. SCIAENA WIENERI Sauvage.

Sciaena wienceri Sauvage, Bull. Soc. Philom., July 7, 1883, p. 156; Peru.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 356.

This species is known only from the original description and appears to be most closely related to *S. starksi*.

Genus UMBRINA Cuvier.

134. UMBRINA XANTI Gill.

POLLA.

Umbrina xanti Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 256; Cape San Lucas.—Jordan and Gilbert, Proc. U. S. Nat. Mus., vol. 4, 1881, p. 278.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1468.

Umbrina analis GÜNTHER, Fishes Central America, 1869, pp. 387, 426; Panama.

One specimen, field No. 1010, 28 cm. long, from Tumbes.

Head 3.65 in length; depth 3.45; eye 5.15 in head; snout 3; maxillary 3; interorbital 3.82; D. X–I, 30; A. II, 7; scales 8–54–13.

Body elongate, compressed, dorsal outline strongly and evenly arched; head conical; snout pointed; mouth horizontal, small, maxillary reaching to below center of eye; border of preopercle sharply and evenly serrate; third dorsal spine longest, 1.71 in head; second anal spine long and well developed, 2.6; pectoral rather small, equal in length to ventrals, the tips of the latter reaching halfway from their base to second anal spine; scales ctenoid, in very oblique rows; membranes of soft dorsal and caudal scaled two-thirds distance to tips; anal with a scaly sheath at base; a considerable area at base of pectoral scaled. "Vocal powers well developed." (Coker.)

Color in life, with many oblique and somewhat irregular stripes of dark brown.

Color in spirits, silvery; olive black stripes extending from head and pectoral region upward and backward along the rows of scales to the base of the dorsal, these somewhat wavy, becoming horizontal on caudal peduncle; fins yellowish.

Genus MENTICIRRHUS Gill.

KEY TO SPECIES.

a^1. Eye 7 in head; scales 9–50 to 52–17 or 18; D. X, I, 20 or 21. *panamensis*, p. 106.

a^2. Eye 6 in head; scales 12–70–20; D. XI, I, 23 or 24 ..... *coker*i, p. 107.

135. MENTICIRRHUS PANAMENSIS (Steindachner).

MUCHACHITA.

Umbrina panamensis STEINDACHNER, Ichth. Beit., vol. 4, 1875, p. 9; Panama.
Menticirrhus panamensis JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1473.—GILBERT and STARKS, Fishes of Panama Bay, Mem. Cal. Acad. Sci., vol. 4, 1904, p. 134.

One example, field No. 1038, 26.4 cm. long, from Capon.

Head 2.82 in length; depth 4.07; eye 7.09 in head; snout 3.71; maxillary 3; interorbital 4.33; pectoral 1.3; ventral 2.22; D. X, I, 21; A. I, 9; scales 9–52 (+2)–17.

Body elongate, rounded, back strongly arched, its greatest depth at origin of dorsal; ventral outline nearly straight; head long, depressed, the interorbital broad and flat; snout blunt, strongly projecting beyond premaxillaries, maxillary extending to below posterior border of pupil; nostrils close together, the anterior provided with a small dermal flap; preorbital broad, equal to horizontal

diameter of orbit; teeth of lower jaw subequal, those of upper jaw similar but with an outer row of a few greatly enlarged canine-like teeth; border of preopercle with a few weak spinules; dorsal high, second dorsal spine longest, 2.1 in head; when depressed the tip of third spine reaching to origin of second dorsal; caudal S-shaped; ventrals small, reaching somewhat more than one-half the distance from their base to origin of anal; pectorals long and well developed, having their origin under middle of opercle and reaching to vent.

Color: Brownish, lighter on belly; fins dark, almost black.

This species is the most abundant representative of the genus at Panama; apparently rare outside of Panama Bay.

136. MENTICIRRHUS COKERI, new species.

Plate 10, fig. 2.

Type.—Cat. No. 77533 U.S.N.M., 16.5 cm. long, and a paratype 16.7 cm. long, from Ancon, taken with seine on beach.

Head 3.45 in length; depth 4.18; eye 6.15 in head; snout 3.63; maxillary 3.63; preorbital 5.8; interorbital 3; D. XI, I, 23; A. I, 9; scales 12–70–20, 65 pores in lateral line to base of caudal.

In form this species closely resembles *M. panamensis*, but is at once recognized by the smaller scales; body elongate, little compressed; dorsal outline to base of soft dorsal evenly rounded, ventral profile straighter; head short, subconical, rather depressed, interorbital evenly rounded; snout blunt, projecting one-half diameter of eye beyond maxillaries; mouth small, inferior; maxillary reaching to below middle of eye; barbel short, stout; nostrils large, anterior edge of first midway between tip of snout and anterior margin of eye, close to second, and provided with a well-developed dermal flap which reaches to the second; teeth in lower jaw in a well-developed band, subequal; outer row of premaxillaries anteriorly, large, canine-like, becoming smaller posteriorly; margin of preopercle armed with small weak,, fleshy serrae, projecting but little beyond the integument.

First dorsal spine very small, fourth longest, 1.9 in head, when depressed the fourth reaching to base of last dorsal spine, caudal somewhat broken, probably S-shaped; ventrals small, their base under origin of dorsal, their tips reaching halfway from their base to third anal ray; pectorals short, broad, not reaching to tip of ventrals, their base under posterior border of opercle, 1.33 in head; scales small, regular, ctenoid; soft dorsal with a low scaly sheath at base; scaly area on base of ventrals.

Color in alcohol: Dusky brown on back and sides, belly washed with brownish white; dorsals and caudal dusky; anal blackish distally, margined with lighter; distal half of ventrals black, margined with lighter; distal half of pectoral black.

The paratype has the head 3.4 in length; depth 4.25; eye 6 in head; snout 3.5; maxillary 3.5; interorbital 3; pectoral 1.4; ventrals 1.82; D. XII, 23; A. I, 9; scales 12–70–20.

This species has been named in honor of Dr. Robert E. Coker, who made important studies of the fishery resources of Peru, in connection with which he made the collections of fishes which form the basis of the present paper.

Genus POLYCLEMUS Berg.

137. POLYCLEMUS PERUANUS (Steindachner).

COCO.

Genyanemus peruanus STEINDACHNER, Ichth. Beitr., vol. 2, p. 29, Sitz. Akad. Wiss. Wien, 1875; Paita; Callao.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 357.

Polycirrhus peruanus JORDAN and EIGENMANN, Rev. Sciaenidae, Rep. U. S. Fish Comm., 1886 (1889), p. 415.

Polyclemus peruanus STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 796.

One example, field No. 09734 (=09112), 39.5 cm. long from Callao, taken with gill net, fishing in the surf at La Ventanilla, between Ancon and Callao.

Head 3.35 in length; depth 3.35; eye 6.4 in head; snout 3.42; maxillary 3; interorbital 2.75; pectoral 1.23; D. XI, I, 26 ($25\frac{1}{2}$); A. II, 8; scales 7–60–16.

Body elongate, back strongly arched; ventral profile nearly straight; head short, stout, depressed on snout and over eye, becoming strongly compressed on nape to origin of dorsal; interorbital space very broad; upper profile of head slightly concave, region over nape, convex; snout very blunt, projecting little beyond the maxillaries; mouth moderate, horizontal; maxillary reaching to below posterior border of pupil; border of preopercle with small, well-developed serræ; a tuft of slender barbels as long as diameter of pupil, at chin, those along inner edge of dentary bones separated by short interspaces; fourth dorsal spine longest, 2.76 in head; soft dorsal long and low, reaching to within a distance equal to length of snout from origin of caudal; caudal S-shaped; anal high, the longest ray 2.13 in head; ventrals long, their tips reaching halfway from base to third anal ray; pectoral broad, longer than ventrals, 1.25 in head; gillrakers short, less than diameter of pupil in length, covered with spinules, 6+10; scales strongly ctenoid; spinous dorsal fitting into a groove between scales; soft dorsal and anal with a scaly sheath at base; membranes of caudal scaled; a small patch of scales at base of pectoral. Color in alcohol, olivaceous, with traces of several dusky crossbands, most distinct under arched portion of lateral line.

This species has been recorded only from the coasts of Peru.

Family OPLEGNATHIDAE.

Genus OPLEGNATHUS Richards.

138. OPLEGNATHUS INSIGNIS (Kner).

LORO; LORITO; PERICO.

Scarostoma insigne KNER, Neue Fische Mus. Godfroy, Sitz. Akad. Wiss. Wien, vol. 56, 1867, p. 7, pl. 2; West Coast of South America.

Oplegnathus insignus ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 359.

Oplegnathus insigne SNODGRASS and HELLER, Shore Fishes of the Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 397.

One specimen, field No. 09570, 16.5 cm. long, from Paita, and two specimens, field Nos. 09475 and 09501, respectively 21 and 4 cm. long, from Lobos de Afuera.

Head 3.03 in length; depth 2; eye 5.04 in head; snout 2.25; pectoral 1.31; D. XI, 17; A. III, 13.

Body strongly compressed, deep, greatest depth 2 in length; depth of caudal peduncle 2.2 in head; head short; snout pointed; eyes small; mouth small; maxillary reaching vertical from anterior border of eye; teeth soldered together, resembling the teeth of some of the scaroids; border of preopercle armed with fine serrations; opercle ending in a spine; dorsal spines stout, membranes deeply incised; soft dorsal and anal high, truncate; caudal lunate; anal spines short, stout, of about equal length; tips of ventrals reaching vent; pectoral short, not falcate; scales very small, strongly ctenoid; soft parts of vertical fins scaled; lateral line strongly arched, parallel with contour of back. Description of No. 09475 from Lobos de Afuera.

No. 09501, 4 cm. in length, from Lobos de Afuera, has head 2.66 in length; depth 2.13; eye 4 in head; snout 3.43; maxillary 3.43; pectoral 1.41; D. XI, 17; A. III, 13.

The marked changes in coloration at the different stages of growth noted by Snodgrass and Heller in Galapagos specimens are apparent in these. In the individual 4 cm. long the ground color is yellowish white crossed by black vertical bars, the first an ocular band meeting its fellow on nape and breast, slightly narrower than eye; the second from origin of dorsal downward and forward across opercle, bending backward across base of pectoral and meeting its fellow in front of base of ventrals; the third crossing posterior half of spinous dorsal and body, meeting its fellow on middle of area between ventral and anal base; the fourth extending across middle of soft dorsal, body, and anterior half of anal; fifth crossing posterior fourth of soft dorsal, caudal peduncle and tips of anal rays; the sixth narrower than the others and crossing base of caudal.

In the specimen 16.5 cm. long, black areas are beginning to appear in the white ground-color dorsally and on distal two-thirds of caudal. The largest specimen agrees well with Kner's illustration of this species.

Color in life of largest specimen: Gaudy with yellow and black; ground color black or nearly so with five (or six) bright yellow bands, completely encircling body at regular intervals, the first crossing head over posterior edge of preopercle, the second from anterior spines of dorsal, passing just behind ventrals, the third from beneath posterior spines of dorsal to anus and spines of anal, fourth halfway between third and fifth, the fifth crossing posterior part of caudal peduncle; these bands wider than eye, but are not solid, including many irregular-shaped black spots; dorsal and anal black with yellow marks—particularly in continuation of the bars on body; caudal mottled with black and yellow; pectoral yellow, with spots and marks of black; ventrals dorsally black, ventrally yellow in proximal part and black in distal region.

Specimens of *O. fasciatus* from Japan show no traces of black supplanting the white bands and have 12 instead of 11 dorsal spines, agreeing in other respects with this species.

Family LATILIDAE.

Genus CAULOLATILUS Gill.

KEY TO SPECIES.

a^1. Head 3.5 to 3.8 in length; depth 4; D. VIII, 26; A. II, 24 or 25; scales 16–118–40 ..... *princeps*, p. 110.

a^2. Head 2.8 to 3.1 in length; depth 3.1 to 3.3; D. VIII, 23 or 24; A. I, 22 or 23; scales 14–101–35 ..... *cabezon*, p. 111.

139. CAULOLATILUS PRINCEPS (Jenyns).

PEJE-BLANCO; PEJE-FINO.

Latilus princeps JENYNS, Zool. Voy. *Beagle*, Fishes, p. 52, pl. 11; Chatham Island.

Caulolatilus princeps JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 3, 1898, p. 2276.—STEINDACHNER, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 35.—SNODGRASS and HELLER, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 417.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 799.

One specimen, field No. 09685, 29 cm. long, from Lobos de Afuera; one, field No. 09122, 26.8 cm. long, from Callao, Lima Market; and one, field No. 09701, 33 cm. long, from Pisco.

Head 3.55 to 3.75 in length; depth 3.9 to 4.1; eye 4.4 to 4.8 in head; snout 2.9 to 3.15; maxillary 2.8 to 3.1; interorbital 3 to 3.35; pectoral

1.1 to 1.2; ventrals 1.5 to 1.75; D. VIII, 26; A. II, 24 or 25; scales 16–118(+3)–40.

Body elongate, fusiform; head short, dorsal profile strongly convex; eye moderate, 1.5 in snout; interorbital broad, rounded; nostrils small, the anterior with a flap; mouth small, oblique; maxillary scarcely reaching vertical from front of eye; teeth small, fine, villiform; vertical border of preopercle evenly and finely serrate.

Scales small, strongly ctenoid, regular in arrangement; preopercle, subopercle, preorbital; region around eye and top of head from tip of snout back to above middle of eye naked; cheeks and opercles scaly, in the smaller examples the scales on cheeks extending on to preopercle and subopercle; dorsal spines short, flexible, of nearly uniform height, slightly shorter than soft rays; membranes of soft dorsal and anal incised; caudal forked, upper lobe longer; ventrals moderate, tips reaching within diameter of pupil of front of vent; pectoral falcate, nearly as long as head.

Color in alcohol: Reddish brown on back, becoming yellowish on belly; fins dusky.

Rocky islands of the Pacific coast from Monterey to Peru and the Galapagos Archipelago.

140. CAULOLATILUS CABEZON, new species.

PEJE-BLANCO; CABEZON; CABEZUDO.

Plate 10, fig. 3.

Type.—Cat. No. 77654, U.S.N.M. (field No. 09160), a specimen 27.5 cm. long, from Chimbote.

A paratype, No. 09553, 31 cm. long from Paita.

Head 2.95 in length; depth 3.2; eye 4.4 in head; snout 3; maxillary 2.64; interorbital 3.95; preorbital 5.57; pectoral 1.33; ventral 1.75; D. VIII, 23 ($\frac{1}{2}$); A. I, 22; scales 14–101(+3)–35.

Body elongate, very deep at shoulders, narrowing posteriorly; caudal peduncle 3.54 in head; head long, profile strongly arched from tip of snout to origin of dorsal; mouth large, oblique; maxillary reaching to vertical from anterior border of pupil; lips fleshy; teeth small, fine, outer teeth stronger, bands of teeth widest in front, narrowing posteriorly to a single row; in the lower jaw the posterior teeth thicker, canine-like; vertical border of preopercle strongly and evenly serrate; opercle ending in a stout spine.

Scales strongly ctenoid, regular in arrangement; preopercle, subopercle, preorbital anteriorly; region around eye, snout, and top of head to above middle of eye without scales; cheeks and opercle scaly; first, second, and third dorsal spines graduated, shorter than the others, which are of about equal length, 3.7 in head, nearly as long as the anterior soft rays; twentieth and twenty-first soft rays longest, reaching to base of caudal, 2.43 in head; caudal nearly truncate, outer rays slightly produced; anal rays long as in dorsal, posterior rays

reaching base of caudal; tips of ventrals reaching vent; pectorals long, slightly falcate, tips reaching vertical from origin of anal; rays and spines all very flexible.

Color in life, a brassy green bar extending from lower side of eye forward (embracing nostril) and parallel to ventral surface of head; bars of opposite sides meeting in front, but there almost lost in the dusky color of the top of the snout; some brassy green on lower part of side of head, on iris which is mottled, and in axil of pectoral; a black spot with a slight olive tint above base of pectoral; fleshy flap on posterior margin of opercle dusky olive; fins tinted with olive.

Color in alcohol: Reddish brown, tinged with olive; opercular flap and an area above pectoral base, dusky olive; fins olivaceous.

The paratype has head 3.04 in length; depth 3.27; eye 4.35 in head; snout 2.9; maxillary 2.55; interorbital 4.04; pectoral 1.2; ventral 1.73; D. VIII, 24; A. I, 23; scales 15–101 (+4)–35. Color in alcohol, olivaceous with a tinge of reddish; belly light olive; opercular flap dark; upper base of pectoral and humeral area black.

This species may be readily distinguished from *C. princeps* by the deep head and body tapering posteriorly (in *C. princeps* the body is much more slender and more uniform); by the longer head and larger eye in specimens of same size, by the truncate form of the caudal, straighter lateral line and larger scales. It agrees with *C. anomalus* from California in having elongated dorsal spines and resembles closely Cuvier and Valenciennes' description of *Latilus chrysops* from Brazil.

Family PINGUIPEDIDAE.

Genus PINGUIPES Cuvier and Valenciennes.

141. PINGUIPES CHILENSIS (Molina).

ROLLIZO.

Esox chilensis Molina, Comp. Hist. Nat. Geo.[1] Civil, vol. 1, 1788, p. 394.

Pinguipes chilensis Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 9, 1833, p. 338 (457).—Gay, Hist. Chile, Zool., vol. 2, 1848, p. 165, I, Atlas, Zool. Ictiol., 1854, pl. 2, fig. 2.—Valenciennes, Les Poiss. Règne Anim. de Cuv., 1850, pl. 16, fig. 1.—Günther, Cat., Fish. Brit. Mus., vol. 2, 1860, p. 252.—Steindachner, Fauna Chilensis, 1898, p. 301.—Delfin, Cat. Peces de Chile, 1901, p. 82.

Two specimens, field Nos. 09716 and 09712, respectively 37.5 and 44 cm. in length, from Mollendo.

[1] Compendio della storia geografit, naturale, e civile del regno del Chile. 8vo. Bologna, 1776.

Head 2.96 to 3.12 in length; depth 4.25 to 4.55; eye 6.65 to 6.75 in head; snout 2.3 to 2.35; maxillary 2.2 to 2.35; interorbital 3.33 to 3.85; pectoral 1.6 to 1.68; ventrals 1.7 to 1.74; D. VI, 28; A. I, 26; scales 27–110 (+6)–37.

Body cylindrical, tapering and somewhat compressed posteriorly; greatest depth under insertion of dorsal; dorsal outline arched, ventral outline comparatively straight; head subconical, profile from tip of snout to above eyes straight; eyes small; interorbital broad and flat; mouth large, slightly oblique; lips thick and fleshy; maxillary reaching vertical from anterior border of eye; teeth in jaws in villiform bands, an outer row of strong canine-like teeth; teeth on vomer and palatines, those on front of vomer stout and blunt; jaws subequal; margin of preopercle entire; two spines on posterior border of opercle; dorsal and anal long and low; dorsal spines much shorter than soft rays; origin of ventral in front of origin of pectoral; scales small, ctenoid, regular in arrangement; cheeks and opercles scaly.

Color in alcohol: Grayish, tinged with brownish red; two rows of round white spots on each side, the first just below dorsal, the second along lateral line anteriorly, rising slightly posteriorly (only traces of these spots discernible in the larger individual); dorsal spines and anterior half of base of dorsal blackish; fins dusky; a black area on upper caudal base, above and not at end of lateral line.

Doctor Coker writes that this fish is locally known as "Rollizo," and is said to be almost the same as the "Bacalao" (cod).

Family CIRRHITIDAE.

Genus CHEILODACTYLUS Lacépède.

142. CHEILODACTYLUS VARIEGATUS Cuvier and Valenciennes.

PINTADILLA.

Cheilodactylus variegatus Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 9, 1833, p. 364 (493); Valparaiso.—Gay, Hist. Chile, Zool., vol. 2, 1848, p. 199.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 357.

Cheilodactylus cinctus Tschudi, Fauna Peruana, Ichth., 1845, p. 15, pl. 2; Peru.

Chilodactylus variegatus Günther, Cat. Fish. Brit. Mus., vol. 2, 1862, p. 81.—Steindachner, Fauna Chilensis, vol. 2, 1898, p. 290; Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 34; Callao.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 797.

One specimen, field No. 09149, 27 cm. long, from Piscadores Island, taken by hand, floating alive on the surface, presumably sick; four, field No. 09155, 9.4–10.6 cm. long, from Ancon, taken on beach with

a seine; one, No. 09410, 20.7 cm. long, from Guanape North Island; one, No. 09572, 16.2 cm. long, from Paita; two, Nos. 09629 and 09630, respectively 16.7 and 14 cm. long, from Independencia Bay, Santa Rosa Island, east side; one, No. 514, 17.7 cm. long, from Mollendo; and two, No. 278, 7.2 and 7.5 cm. long, from Lobos de Afuera, in tide pool in rocks.

Head 2.77 in length; depth 2.62; eye 5 in head; snout 2.81; maxillary 3.8; interorbital 3.8; preorbital 7.6 in head, 1.5 in eye; pectoral 1.36 in head; D. XVII, 29; A. III, 10; scales 8–58 (+3)–15.

Body compressed, rather deep, ovate; snout pointed, interorbital broad and flat; mouth small, lips fleshy; maxillary not reaching vertical from anterior border of eye; teeth in villiform bands; no teeth on vomer or palatines; dorsal spines short, stout, membranes deeply incised; soft dorsal highest anteriorly, graduated; caudal forked; anal falcate, third anal spine longest, one-third longest ray; ventrals moderate, reaching vent; six lower rays of pectoral simple, the two nearest divided rays longest, longer than divided rays.

Color in alcohol: Blackish anteriorly; five or six light crossbars from base of dorsal and on caudal peduncle, downward to ventral surface, these slightly narrower than diameter of eye. Description based on a specimen 27 cm. in length.

An individual 20.7 cm. in length, from Guanape, has head 3 in length; depth 2.63; eye 4.5 in head; snout 2.95; maxillary 4.3; interorbital 5.55; pectoral 1.3; D. XVII, 29; A. III, 9½; dorsal and anal somewhat variable; D. XVI or XVII, 29–31; A. III, 9 or 10; simple rays of pectoral 5 to 7.

Color in life of Guanape Island individuals taken from a comparison of about 20 specimens, as follows: Conspicuous color features are (1) the bright reddish-orange tips and margins of the caudal, anal, ventral, and pectoral fins; (2) about four somewhat irregular white bars, one across caudal peduncle, one extending somewhat obliquely from under anterior end of soft dorsal to anterior end of anal; belly and throat white or nearly so, showing a slight greenish tint in some specimens; the general ground color of sides and back a very dark brown, but on close examination each scale is seen to be broadly margined with dark brown, while centrally they show more or less of a light greenish or brownish gray with decided metallic luster; under surface of opercle very dark except for a broad marginal zone of dusky white; soft dorsal faintly tipped with reddish-orange.

Family APLODACTYLIDAE.

Genus APLODACTYLUS Cuvier and Valenciennes.

143. APLODACTYLUS PUNCTATUS Cuvier and Valenciennes.

JERGUILLA.

Plate 11, fig. 1.

Aplodactylus punctatus.Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 8, 1831, p. 352 (477), pl. 242; Valparaiso.—Jenyns, Zool. Voy. *Beagle*, Fish., 1842, p. 15.—Gay, Hist. Chile, Zool., vol. 2, 1848, p. 156.

Haplodactylus punctatus Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 434; *Challenger* Exp., Shore Fishes, 1880, p. 24.—Delfin, Cat. Peces de Chile, 1901, p. 71.—Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 30.

Two specimens, field Nos. 430 and 09723, respectively 32 and 36.5 cm. long, from Callao, and one, field No. 477, 24.5 cm. in length from Ballestas Island, region of Pisco, taken with a trammel net in 1 to 3 fathoms of water, where this species is known as "Nuñora" or "Senorita."

Head 3.72 in length; depth 2.83; eye 5.92 in head; snout 2.68; maxillary 3.32; interorbital 3.32; pectoral 1.15; ventral 1.41; D. XV–I, 20; A. III, 9½; 100 pores in the lateral line. Body stout, caudal peduncle deep, 2.18 in head; head conic; snout blunt; interorbital low, convex; eye small, high, its diameter above level of tip of snout; lips fleshy; mouth small, maxillary not reaching front of eye; teeth strong, flat, tricuspid in outer row, small cardiform teeth behind these; scales small, lateral line with a long low curve; fins scaly; dorsal spines stout; anterior rays of soft dorsal longest; caudal lunate; anal long; six lower rays of pectoral simple, thickened; first simple ray longest.

Color in alcohol: Ground color yellowish olive, everywhere dotted with small black spots, in many places the spots united to form rivulations. Described from an example 36.5 cm. long from Callao.

Specimen, field No. 477, has head 3.54 in length; depth 3; eye 5 in head; snout 2.5; interorbital 3.05; pectoral 1.14; six lower pectoral rays simple; D. XV–I, 20; A. III, 9½.

The validity of *Aplodactylus reginae*, *A. vermiculatus*, and *A. guttatus* of Gay, as distinct species, is questionable, the main point of difference appearing to be one of coloration.

Family CICHLIDAE.

Genus AEQUIDENS Eigenmann and Bray.

144. AEQUIDENS RIVULATUS (Günther).

SARRA; MAJARRA.

Plate 11, fig. 2.

Chromis rivulata GÜNTHER, Proc. Zool. Soc. London, 1859, p. 418.
Acara pulchra GÜNTHER, Cat. Fish. Brit. Mus., vol. 4, 1882, p. 280.
Acara rivulata REGAN, Fishes of the South American Cichlid genus Acara Ann. Mag. Nat. Hist., ser. 7, vol. 15, 1905, p. 338.

Five specimens, field No. 09431, and three specimens, No. 09432, 3.3 cm. to 15 cm. in length, from Pacasmayo, taken from a small dirty stream flowing through the village, and two specimens, field No. 299, 11 and 11.2 cm. long, from Eten, taken in Rio de Eten about 1 mile from its mouth. Local name of species, Majarra.

Head 2.68 to 2.8 in length; depth 2.25 to 2.55; eye 4.28 to 5.25 in head; maxillary 3 to 3.4; snout 2.1 to 2.37; pectoral 1.1 to 1.2; scales 4–26 or 27–9; D. XIV, 11 or 12; A. III, 9 or 10.

Body compressed, greatest depth at origin of dorsal; upper profile of head straight in smaller individuals, usually slightly concave in larger examples; interorbital slightly concave or flattened; maxillary not reaching vertical from front margin of eye; scales heavy, horny; posterior rays of dorsal and anal lengthened, their tips reaching in older examples nearly to the middle of the caudal.

Color in life: Gaudy with green and blue markings which fade rapidly in formalin; upper parts of head olivaceous (sides and lower parts mostly green and blue (the green changing to blue in the air); markings irregular and unsymmetrical, but a narrow stripe of bluish green extending from below eye to upper jaw, two-thirds of the way back from front of jaw, and below this stripe another parallel to it; still other spots and lines above these; ground color of body olivaceous, crossed by three to five light vertical bars, a black spot, larger than eye, about midway between opercle and caudal, below lateral line; another at base of caudal; these spots conspicuous in small examples and hardly observable in the largest; upper parts of sides, vertical fins and ventrals, spotted with blue or green; caudal and dorsal tipped with white; pectoral light olivaceous.

Some specimens were lighter than others; the smaller the fish the more distinct were the light bars.

Regarding the fishes taken at Pacasmayo, Doctor Coker writes: "These specimens were taken in a small, dirty stream flowing through the village of Pacasmayo, and conveying to the ocean the surplus water from drainage ditches fed from the Jequetepeque River. Beginning at the bay I worked up for about half a mile meeting the different kinds in the following order: 'Licitas' (young *Mugil cephalus*); 'Ancho' (*Astyanax peruanus*); 'Chorocoque' (*Lebiasina bimaculata*); 'Cameron' (shrimp); 'Sarra' (*Aequidens rivulatus*); 'Liza' (large *Mugil cephalus*). Taking fish as I came down, this order was exactly reversed."

Family POMACENTRIDAE.

THE DEMOISELLES.

KEY TO GENERA.

a^1. Teeth conical, or villiform, not compressed ..... *Chromis*, p. 117.
a^2. Teeth not conical or villiform, somewhat compressed; preopercle entire in adult.
  b^1. Suborbitals entirely adnate to the cheeks ..... *Nexilosus*, p. 121.
  b^2. Suborbitals not adnate to the cheeks ..... *Abudefduf*, p. 123.

Genus CHROMIS Cuvier.

KEY TO SPECIES.

a^1. Dorsal spines 13 ..... *crusma*, p. 118.
a^2. Dorsal spines 12.
  b^1. Caudal fin uniform in coloration ..... *intercrusma*, p. 119.
  b^2. Caudal fin with a broad black border on each lobe, narrowly margined with lighter, central part of fin light ..... *atrilobatus*, p. 117.

145. CHROMIS ATRILOBATUS Gill.

Chromis (*Furcaria*) *atrilobata* Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 149; Cape San Lucas.

Chromis atrilobatus Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1546.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 139, pl. 21, fig. 43.

One specimen, field No. 09478, 11 cm. in length, and three specimens, field No. 09440, 5.7 to 7.5 cm. in length, from Lobos de Afuera.

Head 3.36 in length; depth 2.62; eye 3.57 in head; snout 3.84; maxillary 2.77; D. XII, 13; A. II, 10 (normally there are 11 or 12 rays in the anal); scales 3–28–9, 20 pores.

Body slender, greatest depth at origin of dorsal; a slight depression over eye in longitudinal contour; top of head everywhere transversely convex; preopercle oblique, sometimes slightly emarginate in its lower half, mouth small, oblique; teeth in bands in each jaw, those in the outer row large, conical, curved; spinous dorsal low, of uniform height; soft dorsal and anal angulated; caudal lobes long, pro-

duced into filaments, fin deeply forked; ventrals moderate, in some specimens with the first ray filiform; pectoral long and angulated, equal to or greater than length of head.

Color in life: Olivaceous above; below bluish silvery, and very obscurely striped; a pale spot (gold when first taken) on back at posterior limit of dorsal, the spots of the two sides confluent posteriorly behind dorsal; a broad black stripe extending from insertion of each lobe of caudal to its slender tip; just above dorsal stripe and just below ventral stripe the fin is very narrowly margined with pink; between the stripes the fin is olivaceous proximally and pink posteriorly; dorsal almost black, a small part including last two to four rays olivaceous proximally and reddish distally; distal half of anal light olive, pectoral reddish at base, insertion black.

This species occurs from Cape San Lucas southward to Lobos de Afuera, Peru. It is reported to be very abundant about the islands in Panama Bay; not recorded from the Galapagos Islands.

146. CHROMIS CRUSMA (Cuvier and Valenciennes).

CHAVELITA; JUNICHE; CONGUYO.

Heliases crusma CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 9, 1833, p. 377 (510), (part); Valparaiso, Chile (specimen from Juan Fernandez Island not this species.—JENYNS, Zool. Voy. *Beagle*, 1842, p. 54.—GAY, Hist. Chile, Zool., vol. 2, 1848, p. 206 (part), I, Atlas Zool. Ictiol., 1854, pl. 4, fig. 1.—VALENCIENNES, Poiss. Règne Anim. de Cuv., 1850, pl. 33, fig. 2.

Heliastes crusma GÜNTHER, Cat. Fish Brit. Mus., vol. 4, 1862, p. 61.—STEINDACHNER, Fauna Chilensis, vol. 4, 1898, p. 317.

Chromis crusma ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 358.—DELFIN, Cat. Peces de Chile, 1901, p. 76.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 798.

Two specimens, field Nos. 508 and 515, respectively 17.5 and 14 cm. long, from Mollendo; one, field No. 09144, 15.1 cm. long from Callao; and seven, field No. 09627, 4.2 to 13 cm. long from Independencia Bay, Santa Rosa Island, east side.

Head 2.95 in length; depth 2.03; eye 3.66 in head; snout 4; interorbital 3.1; scales $3\frac{1}{2}$–27–10, 20 pores; D. XIII, 12; A. II, 12; P. 20.

Body short, deep ovate and rather thick, the dorsal outline slightly more convex than the ventral; snout short and abruptly conic, shorter than eye; interorbital rounded; opercle, preopercle and suborbital entire; preopercular margin varying considerably, in some specimens the free sides nearly straight, closely approaching a right angle, in others the vertical portion strongly concave; opercle ending in two small flat spines, the upper obscure; teeth conic, in three or four rows in each jaw, the outer series enlarged, close-set; third dorsal spine

longest, 2.13 in head; soft dorsal considerably higher than spinous portion, rather acute, the middle rays elongate, longest rays 1.65; second anal spine long and stout, 1.94, anal rounded, not so acute as soft dorsal, longest rays 1.86; caudal deeply emarginate, the upper lobe slightly longer than lower, equal to head in length; ventrals elongate, reaching past vent and in some specimens to base of anal, 1.35; pectoral broad, longer than head .9 in head; scales large, regular, strongly ctenoid, densely covering entire body and head except anterior border of snout; lateral line well developed, arched, following contour of back to within two scales of base of dorsal, where it ceases; fins scaled at base, those on spinous dorsal largest.

Color in alcohol, bluish black on back, scales on sides with a central area of silver, margin dusky; approaching the ventral surface, the silver area increasing in size until it covers all of the scale except a narrow marginal line; scales more or less punctulate with dusky; dorsal blackish; caudal dusky white; anal blackish; ventral blackish, mottled with light; pectoral silvery translucent, base iridescent bluish, darkest in upper angle. Description based chiefly on a specimen 17.5 cm. long from Mollendo.

The individuals from Santa Rosa Island are dark brown, quite uniform in coloration, but showing some traces of the silvery central areas to scales in places; caudal and pectoral darker; iridescent blue base of pectoral very distinct.

Color in life of field No. 09144, back and sides dusky above, sides lighter; scales with dusky margin, light within; belly and lower part of sides silvery; membrane between rays of pectoral very transparent; some specimens much lighter than others.

This species is known under a considerable number of common names; our specimens from Callao were called "Chavelita"; at Santa Rosa, "Conguyo"; at Mollendo, "Juniche." Abbott records individuals from Callao under the names "Cognito" or "Conquito," and Delfin states that the names "Castaneta," "Boquilla," "Frailecito" and "Pampanito" are applied to this species by fishermen on the coasts of Peru and Chile.

147. CHROMIS INTERCRUSMA, new species.

CHAVELITA.

Plate 11, fig. 3.

Heliases crusma CUVIER and VALENCIENNES (part), Hist. Nat. Poiss., vol. 9, 1833, p. 377 (510); Juan Fernandez Island (not the types from Valparaiso).—GAY, Hist. Chile, Zool., vol. 2, 1848, p. 206 (part).

Type.—Cat. No. 77590 U.S.N.M. (field No. 09403), a specimen 15 cm. long from Guanape North Island.

One specimen, field No. 09457, 13.1 cm long, and three specimens, field No. 09445, 7.8 to 8.7 cm. long, from Lobos de Afuera.

Cuvier and Valenciennes base their description of the species *Heliases crusma* upon two individuals 5½ inches long from Valparaiso, Chile, and include an individual 8 inches long from Juan Fernandez Island, indicating certain differences between this example and those from Valparaiso. Specimens in our collection from Mollendo, Callao, and Santa Rosa Island agree very well with their description of the Valparaiso examples; other specimens in our collection taken at Guanape and Lobos de Afuera present certain of the differences indicated in their example from Juan Fernandez Island and possess other characters which serve to definitely separate the latter as a distinct species, to which we have given the name *Chromis intercrusma*.

The type (field No. 09403) from Guanape North Island has the following comparative measurements: Head 3.2 in length; depth 2.15; eye 3.9 in head; snout 4; maxillary 3.04; D. XII, 14; A. II, 14; P. 20; scales 3½–27–10, 20 pores.

Body short, deep, ovate, and compressed, the curvature of the dorsal and ventral outlines nearly equal; snout short, conical, shorter than eye; interorbital rounded, with a slight depression in center; teeth conic, in three or four interrupted rows, those in outer row slightly larger than others; opercle, preopercle, and suborbital entire; vertical border of preopercle nearly straight, the angle rounded; opercle ending in two flat, rather obscure spines; fourth to sixth dorsal spines longest, equal in length, 2.4 in head; middle rays of soft dorsal longest, acute, longest ray 1.75 in head; caudal forked, upper lobe slightly the longer, longer than head, 0.87; second anal spine moderate, 2.12; soft anal acute or slightly rounded posteriorly, longest ray 1.92; ventrals moderate, reaching to behind vent, 1.4; pectoral rounded, shorter than head, 1.09; scales large, regular, close-set, ctenoid, covering all of body and head except snout and tip of lower jaw; those on upper surface of head, around eye, on cheeks and under surface of head, small and crowded.

Color in alcohol, brown, centers of scales dark brown, marginal half lighter on those below the lateral line, the separation of the two colors most distinct ventrally; dorsal, anal, and ventrals very dark brown; caudal dusky brown, inner margin of lobes lighter; pectoral tawny, base dark brown, darkest in upper angle; a trace of blue iridescence near posterior border of opercle.

A paratype (field No. 09457) has the following comparative measurements: Head 3.16 in length; depth 2.06; eye 3.33 in head; snout 4.2; interorbital 3; pectoral 1; D. XII, 14; A. II, 13; scales 3½–27–10. Coloration like that of the type but darker.

Color in life of a paratype (field No. 09445): Dusky bluish; a black spot in axil of pectoral.

This species is easily distinguished from *Chromis crusma* by the shorter head, shorter pectoral (in this species it is equal to or less than head; in *crusma*, it is always longer than the head); by the differences in the fin formulas of dorsal and anal and by the slenderer, more compressed body, especially anteriorly.

Cuvier and Valenciennes note that the example from Juan Fernandez differed from the others in having the vertical border of the preopercle straight instead of concave and the angle more acute, the upper lobe of the caudal longer and more pointed, causing the forking of the fin to appear deeper. These characters do not appear to be of specific importance in separating this species. In our examples of each species the straightness of the vertical border of the preopercle varies, as does the forking of the caudal lobes. This species is found in the vicinity of the small island groups on the coasts of Peru and Chile.

Genus NEXILOSUS Heller and Snodgrass.

148. NEXILOSUS LATIFRONS (Tschudi).

CASTANETA; SARGO DE PENA.

Pomacentrus latifrons Tschudi, Fauna Peruana, Ichth., 1845, p. 17; Huacho, Peru.—Günther, Cat. Fish. Brit. Mus., vol. 4, 1862, p. 34.
Glyphidodon latifrons Steindachner, Fauna Chilensis, 1898, p. 316.
Eupomacentrus latrifrons Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 358.
Abudefduf latifrons Delfin, Cat. Peces de Chile, 1901, p. 75.
Nexilosus albemarleus Heller and Snodgrass, Proc. Washington Acad. Sci., vol. 5, pl. 8, 1903, p. 204; Albermarle Island.—Snodgrass and Heller, Shore Fishes of the Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 391.

One specimen, field No. 509, 20.3 cm. in length from Mollendo; two, field Nos. 09171–2, respectively 19 and 14.6 cm. in length, from Guanape North Island; one, field No. 09443, 13.4 cm. in length, and three young examples, field No. 278, 2 cm. in length, from Lobos de Afuera (the small individuals taken from a small tidal pool).

Head 3.2 (4 total) in length; depth 1.97 (2.5); eye 4.9 in head, 1.9 in snout, 2.2 in distance between lower edge of orbit and lower edge of preopercle; preorbital 1.11 in eye; snout 2.5 in head; D. XIII, 18; A. II, 14; scales 4–27–12, 22 pores.

Body ovate, deep, rather thick, curvature of dorsal outline greater and more regular than that of the ventral outline; snout moderate, blunt; mouth small, nearly horizontal, lips thick; teeth well developed, in a single series, compressed at tips, entire, incisor-like; nostril very small, slightly above lower level of orbit; suborbital adnate to cheek, lower free portion distinct; vertical border of preopercle nearly straight, the lower border rounded; opercle ending in

a single flat spine, above which in the upper angle are two others, indistinct.

Spinous dorsal low, upper outline sinuous, fifth spine longest, 2.7 in head; soft dorsal much higher, acute, the posterior rays shorter than the anterior, longest ray 1.44; caudal deeply forked, the lobes large and round, of which the upper is considerably longer, equal to length of head; anal spines small, the second the longer, 3 in head, middle rays of anal longest, 1.7 in head; depth of caudal peduncle 1.88; ventrals moderate, reaching to behind anus, 1.16; pectoral broad, upper rays longest, 1.09 in head; scales large, regular, densely covering body and head except snout in front of eyes, area around mouth, and lower margin of preopercle; scales along middle of side largest, most of them with accessory scale at base, those above lateral line most numerous; fins densely scaled, those on spinous dorsal concealing all but tips of spines.

Coloration in life: Back and sides a very dark brownish olive, each scale with a very dark margin, lighter centrally; a bright bar of dusky gold extending incompletely across body a short distance before anterior end of anal; fleshy flaps margining opercle very dark; soft parts of fins black; throat and lower parts of head a light chestnut brown. Description based on a specimen (field No. 509) 20.3 cm. long, from Mollendo.

Color in life of a specimen (field No. 09172) 14.6 cm. long, from Guanape North Island, general color dark olive green, lightened by the golden bar and the metallic greenish centers of the scales, the greenish centers giving place in some parts, especially anteriorly, to bluish or violet; lower part of head and throat tinted purple.

In alcohol, the individuals from Guanape and Lobos de Afuera are much darker (almost a bluish black) than the one from Mollendo, the latter having a decided brownish cast.

The three small examples (No. 278) taken in a tidal pool in the rocks were in life brilliant blue in color; in the water, the general color of darker blue varied by shining spots of lighter blue. They have D. XIII, 18 or 19; A. II, 14; scales 4–28–12; preopercle strongly serrate; top of head and region around mouth to below anterior margin of pupil without scales.

From a study of the young it is evident that the genus *Nexilosus* is very close to *Pomacentrus*, differing in the adnate condition of the suborbital, a condition which appears to be approached by some of the young of this genus.

The only previous records of this species are those of Tschudi who obtained a few examples, 9 inches long, from Huacho, Peru; two large examples, 21.9 and 22.5 cm. long obtained by Doctor Plate at Cavancha Bai near Iquique and described by Steindachner, and several specimens obtained by Heller and Snodgrass at Tagus

Cove, Elizabeth Bay and Iguana Cove, Albemarle, Galapagos Islands. The latter have an excellent figure and description of the species under the name of *Nexilosus albemarleus*.

Genus ABUDEFDUF Fórskal.

149. ABUDEFDUF SAXATILIS (Linnaeus).

Chaætodon saxatalis Linnaeus, Syst. Nat., ed. 10, 1758, p. 276.
Abudefduf saxatalis Jordan, Fishes of Sinaloa, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 475.—Jordan and Evermann, Fishes of North and Mid. Amer., vol. 2, 1898, p. 1561; vol. 4, 1900, pl. 234, fig. 590.
Glyphisodon saxatalis Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 143.
Abudefduf marginatus Snodgrass and Heller, Shore Fishes of the Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 390.

One specimen, field No. 278 (part), 5.7 cm. long from Lobos de Afuera, taken from a very small shallow tide pool in the rocks.

Head 3 in length; depth 2.04; eye 2.72 in head; snout 3.33; maxillary 3.33; P. 1.15; V. 1.52; scales $4\frac{1}{2}$–27–11; D. XIII, 14; A. II, 13.

This specimen is small and badly distorted.

Family LABRIDAE.

THE WRASSE FISHES.

KEY TO GENERA.

a^1. Vertebrae 27 to 29 (so far as known); dorsal spines 11 to 13; sides of head more or less scaly.
  b^1. Scales large, 5–33 to 35–12 ..... *Bodianus*, p. 123.
  b^2. Scales small, 9–52 to 55–20 ..... *Pimelometopon*, p. 127.
a^2. Vertebrae 23 to 26; dorsal spines 8 to 9; head mostly naked. *Halichoeres*, p. 128.

Genus BODIANUS Bloch.

KEY TO SPECIES.

a^1. Color in life not red; pale blue, with a yellow patch behind the pectoral fin, which has a large dark spot on its extremity; head, tail and fins bright red, their tips black and yellow; forehead very gibbous in the adult; depth 3 to 3.5. Female brownish yellow; a dark band commences behind the snout and is divided into two behind the eye, the upper portion running along the back and nearly joining its fellow from the other side on the back of the free portion of the tail, while the lower crosses the angle of the operculum, and is continued on to the middle of the tail, terminating near the caudal and alternating with two spots behind the base of the caudal fin; fins yellowish or orange. Forehead scarcely gibbous in the adult ..... *diplotaenius*, p. 124.
a^2. Color chiefly red or black, without dark bands or stripes; body without dark crossbands or stripes; general color vermilion, with two large, irregular, black blotches on the back and dorsal fin, the anterior on the first six dorsal spines, the posterior extending over the whole soft dorsal and over a portion of the back of the tail; snout pointed, with upper profile slightly concave; head longer than high; caudal emarginate ..... *eclancheri*, p. 125.

150. BODIANUS DIPLOTAENIUS (Gill).

GALLO.

Harpe diplotaenia Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 140; Cape San Lucas.—Jordan, Fishes of Sinaloa, Proc. California Acad. Sci., ser. 2, vol. 5, 1895, p. 480.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1582.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 144.

Bodianus diplotaenius Snodgrass and Heller, Shore Fishes of the Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 391.

Two specimens, field Nos. 09439 and 09683, respectively 17.5 and 34 cm. long, from Lobos de Afuera.

Head 3.03 in length; depth 2.93; eye 6.35 in head; snout 2.4; interorbital 3.42; pectoral 1.53; ventral 1.64; D. XII, 11; A. III, 13; scales 5–33–12.

Body compressed; head short; snout concave, becoming convex over eyes; fleshy pad on forehead little developed; mouth moderate, maxillary scarcely reaching vertical from front of eye; lips fleshy, lower lip with a flap on each side; upper jaw with four long, strong, pointed canines in front; behind these small granular teeth, somewhat coalescent and forming a single row posteriorly, those at back of jaws enlarged, canine-like; at extreme posterior end a long pointed canine tooth, bent forward; teeth of lower jaw similar, irregular, no canine at posterior end of jaw; vertical border of preopercle with fine denticulations; dorsal spines low, strong, covered with membrane, membranes incised nearly to base of fins, a rounded fleshy flap covering the spines extending for some distance beyond the tips of the spines; middle rays of dorsal filamentous 1.5 in head; caudal lunate; anal similar to soft dorsal; ventrals moderate, not reaching vent; pectoral short and broad; pectoral base a little in advance of ventrals; scales large, regular in arrangement, dorsals and anal sheathed; top of head, snout, and oral region scaleless; cheeks and opercles scaly.

Color in alcohol, olivaceous, scales margined with brown; a dark brown band extending from tip of snout through eye, where it divides into two bands, the upper extending obliquely upward and backward to dorsal surface of caudal peduncle, where it is joined with its fellow by two dark-brown saddles; the second horizontal and ending on caudal peduncle, not to base of caudal; these bands not continuous but interrupted, formed by a series of rectangular dark-brown blotches, most distinct posteriorly; on the base of the caudal, above and below the lateral line, are two rectangular brown areas; top of head mottled; vertical fins brown and yellow; ventrals dusky yellow; pectoral yellow, tipped with black. Description based on an individual 34 cm. long, from Lobos de Afuera. Color in life: Of graceful form and delicate blend of colors. Poste-

rior margins of scales olive green, centers light and tinted red; two black stripes of somewhat irregular outline on sides (½ cm. wide in specimen 18.5 cm. long), the lower extending from lower part of eye to a point halfway between posterior limit of dorsal and anal and the posterior limit of scales on the caudal; the other from middle of eye upwards a little and then parallel to the other stripe and at a distance from it of 1 cm. to dorsal margin of peduncle; two black spots on scaly part of base of caudal placed symmetrically above and below lateral line; usually an orange spot between end of stripe and the black spot; dorsal, proximal, and ventral parts of caudal reddish, otherwise tinted with gold; dorsal and anal fin rays large-tipped with blue and purple; extreme posterior parts of both fins below longest fin rays with mixed red and gold; pectoral reddish; ventrals purplish; iris golden posteriorly, red anteriorly; skin covering jaws red posteriorly.

The coloration and form of this species are subject to considerable variation. In the adult male there is a large fleshy pad on the forehead, this often reaching a height of several times the diameter of the eye; this pad said to be much less pronounced in the female. In the young the snout is pointed and the caudal truncate.

This species occurs along the coast of tropical America, Galapagos Island southward to Peru.

151. BODIANUS ECLANCHERI (Valenciennes).

VIEJA NEGRA.

Cossyphus eclancheri Valenciennes, Voy. *Venus*, Zool., Poiss., 1855, p. 340, pl. 8, fig. 2, 1846; Galapagos Islands.

Harpe eclancheri Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1583.

Bodianus eclancheri Snodgrass and Heller, Shore Fishes of Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 392.—Kendall and Radcliffe, Mem. Mus. Comp. Zool., pl. 35, No. 3, April, 1912, p. 137; Wreck Bay, Chatham Island.

Two specimens, field Nos. 09442 and 09452, respectively 26 and 21.3 cm. long, and three, field Nos. 09461–3 (heads only), from Lobos de Afuera.

Head 2.9 in length; depth 2.38; eye 6.16 in head; snout 2.96; maxillary 3.36; interorbital 3.36; pectoral 1.37; ventrals 1.32; D. XIII, 11; A. III, 12; scales 5–35–12.

Body short and deep; head longer than high; snout pointed; slight trace of fleshy pad of adipose tissue on forehead; teeth essentially the same as in *B. diplotaenius;* canines compressed, stout; preopercle serrulate; cheeks, opercle, subopercle and interopercle scaly; preopercle naked; scaling and shape of fins essentially as in *B. diplo-*

taenius. In the specimen here described the ventrals are filamentous, reaching to vent; longest dorsal ray 1.76 in head; longest anal ray 1.85.

Color in alcohol bluish black.

This description is based on a specimen 26 cm. long, from Lobos de Afuera.

Another example 21.3 cm. long, had the following measurements: Head 3.16 in length; depth 2.37; eye 5.4 in head; snout 3; interorbital 3; pectoral 1.12; ventrals 1.35; longest dorsal ray 1.42; longest anal ray 1.58; D. XII, 11; A. III, 12; scales 5–35–12.

Field No. 09461, of which only a portion of the head was saved, must have been a much larger fish. In it the adipose tissue on forehead is well developed, its height 1.4 in length of snout; two of the canines in upper jaw are much compressed and hollowed out on the under side; jaws behind canines with 7 or 8 short, blunt, teeth, a single stout tooth on posterior end of left side, three on the right side, the anterior of these being the longer.

Color in life of these specimens, almost black with some bluish mottlings; under side of head bluish. In some specimens at least a black bar passes from eye to eye over the head just back of the lump. The only bright color is seen in the iris, which is a mixture of gold and dusky.

Regarding the use of the names "vieja," "negra," "jobero," etc., Doctor Coker writes: "The 'negra' is applied only to small and perfectly black specimens. Larger black specimens are called 'vieja' or 'vieja negra.' The 'jobero' or 'hobero' seems to be the same species, but the name applies only to specimens of a brilliant orange or yellow or white, or partly of one of those colors. 'Vieja colorado' is applied to large red or brown specimens. I am not sure that this name is not sometimes applied to the 'mulata,' a related fish sometimes of variable color, sometimes red, but with smaller scales (50 or more in lateral line as compared with about 30 in lateral line of 'vieja'). The 'jobero' may be white (unpigmented) in parts or over the entire body, when it presents a striking washed-out appearance. The color variation in 'viejas' and 'joberos' is remarkable. One part of the body may be dark red, brown, or jet black, while another part is bright yellow, orange, or white. The two colors will be separated by the sharpest sort of line, though their distribution may be entirely irregular and unsymmetrical. Thus a fish with general color of dark reddish brown may have a pure white head, the unpigmented area extending much farther back on one side than on the other. The 'gallo' has a characteristic color pattern."

From the above description it is evident that the same wide range of color variation occurs here as is recorded in specimens from the

Galapagos Islands. A comparison of the various common names with the identified specimens in our collection indicates that the term "vieja negra" is applied to the black variety of this species, "vieja colorado" to *Pimelometopon darwinii;* "gallo" to *Bodianus diplotaenius;* "mulata" to both *B. diplotaenius* and *P. darwinii.*

Although the only representatives of *B. eclancheri* in our collection are of the black variety, it is evident that the name "jobero" applies to specimens of this species having a more brilliant coloration, yellow, orange, or white and black, or combinations of these colors.

Genus PIMELOMETOPON Gill.

152. PIMELOMETOPON DARWINII (Jenyns).

MULATA; VIEJA COLORADO.

Pimelometopon canis (Philippi), included by Abbott in his list of Marine Fishes of Peru, has been recorded from Iquique and may occur on the Peruvian coast.

Cossyphus darwinii Jenyns, Voy. *Beagle*, Fishes, 1842, p. 100, pl. 20; Chatham Island.

Labrus asper Valenciennes, Voy. *Vénus*, Poiss., 1855, p. 338, pl. 8, fig. 1.

Trochocopus darwinii Günther, Cat. Fish. Brit. Mus., vol. 4, 1862, p. 100.—Steindachner, Fauna Chilensis, 1898, p. 317.

Pimelometopon darwinii Gill, Proc. Acad. Nat. Sci. Phila., 1864, p. 59.—Jordan and Evermann, Fishes of North and Mid. Amer., vol. 2, 1898, p. 1586.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 359.—Snodgrass and Heller, Shore Fishes of the Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 394.

Four specimens, field Nos. 09465–6 and 09678–9, respectively 25.5, 31.7, 25, and 32 cm. long, from Lobos de Afuera. Field Nos. .09465–6 were taken on the west side of westward islands. One specimen, field No. 507, 26 cm. long, from Mollendo.

The genus *Pimelometopon* is close to *Trochocopus* of Günther, but differs in the possession of a greater number of scales and a serrulate preopercle (at least in the young), a character not noted in earlier descriptions.

Head 2.75 in length; depth 2.98; eye 6.06 in head; snout 2.34; interorbital 3.5; pectoral 1.57; D. XII, 10; A. III, 12; scales 9–52–20.

Body deep, compressed; head large; snout pointed, its contour straight; gape of mouth extending to vertical from anterior border of eye; lips fleshy, lower jaw with a flap on sides as in *Bodianus*, with which it agrees also in the character of the teeth; eye small, about half width of interorbital; margin of preopercle with fine serrulations; fins essentially as in *Bodianus;* scales smaller.

Color in alcohol, olivaceous; a large light olive area on side above pectoral; a large black blotch covering first three dorsal spines. Description based on a specimen 32 cm. long, from Lobos de Afuera.

Our only example from Mollendo has the following measurements: Head 2.77 in length; depth 2.92; eye 6.5 in head; snout 2.6; interorbital 3.22; pectoral 1.56; D. XII, 10; A. III, 12; scales 9–54–20.

This individual is olive yellow in spirits and the blotch on front of dorsal is black.

According to Dr. R. E. Coker, this species shows remarkable color variation in life, and doubtless individual specimens are subject to marked changes of color. Some, like No. 09465, are flaming red; others, as No. 09466, are of a somber chocolate color with a reddish tinge only in places; underside of head dusky, except region of lower lip which is white; small olive spots more or less noticeable on top of head; caudal, centrally and distally, olive tinted.

Steindachner's statement, in Fauna Chilensis, that the formula for the transverse rows of scales is 8/1/9 is evidently an error and should be read 8/1/19.

Genus HALICHOERES Rüppell.

153. HALICHOERES DISPILUS (Günther).

SAN PEDRANO; DONCELLA.

Platyglossus dispilus GÜNTHER, Proc. Zool. Soc. London, 1864, p. 25; Panama.

Halichoeres dispilus JORDAN, Fishes of Sinaloa, Proc. California Acad. Sci., 2, vol. 5, 1895, p. 481, pl. 45; Panama.

Iridio dispilus JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1597.

One specimen, field No. 423, 19.8 cm. long, from Callao, near San Lorenzo Island; one, field No. 09631, 16 cm. long, from Independencia Bay, Santa Rosa Island; and one, field No. 09488, 18.3 cm. long, and two, field No. 09499, 8.8 and 15.2 cm. long, from Lobos de Afuera.

Head 3.18 to 3.37 in length; depth 3.5 to 3.6; eye 6.3 to 7.3 in head; snout 3 to 3.2; interorbital 4.4 to 4.9; pectoral 1.4 to 1.44; D. IX, 11½; A. III, 12; scales 2½–2 7–9.

Body slender, compressed; curvature of dorsal and ventral outlines similar; greatest depth of body under fourth dorsal spine; head moderate, snout pointed; eye small, about 2 in interorbital; mouth small, jaws subequal, lips fleshy; four strong canines in front of each jaw followed by a single row of smaller teeth; a strong canine at posterior end of upper jaw, its tip directed forward; dorsal spines short, flexible, their tips barely projecting beyond the membrane; posterior rays of dorsal longest, about 2.75 in head; caudal double-concave; anal similar to soft dorsal; ventrals small, tips reaching halfway from base to origin or anal; pectoral short and broad.

Scales large, regular in arrangement; head without scales; a line in front of dorsal along median line of back not crossed by the scales; lateral line arched, following contour of back.

Color in alcohol, olivaceous or yellow tinged with red; a large black area under fourth dorsal spine, crossing lateral line, more pronounced below line; black area confined to center of scales, margins lighter; two individuals with a distinct black notch at base of caudal; a black area on opercle; fins body color; sides of head with 4 or 5 wavy bands, these indistinct or absent in these individuals.

Pacific coast of tropical America, Mazatlan to Peru.

Family SCARIDAE.

THE PARROTFISHES.

Genus XENOSCARUS, new genus.

Type of genus.—Xenoscarus denticulatus. Jaws subequal, the lower barely included; gill membranes narrowly joined to the isthmus, across which they form a broad fold; upper lip double for its entire length; lateral line continuous; one row of scales on cheek; teeth white, distinct, imbricated in regular oblique rows in both jaws, wholly concealing the dental plates to the anterior edge of which they are affixed; cutting edge of each jaw formed by the outer teeth, the dental plate not reaching the edge, and visible only from within; dorsal spines IX, soft and flexible; base of dorsal and anal with scaly sheath.

This genus is related to *Calotomus* in the character of the teeth and flexibility of dorsal spines, but differs from it in having the upper lip double for its entire length, in this respect agreeing with *Sparisoma*, and in having the gill membranes forming a broad fold across the isthmus. From *Scarichthys* Bleeker, it differs in having the teeth distinct.

(ξενος, strange; σκαρος, Scarus, the ancient name of *Sparisoma cretense*).

154. XENOSCARUS DENTICULATUS, new species.

POCOCHO DE MAR.

Plate 12, fig. 1.

Type.—Cat. No. 77619, U.S.N.M., a specimen 25 cm. in length field No. 09474), and paratype field No. 09500, 24.1 cm. in length, from Lobos de Afeura.

Head 3.16 in length; depth 3; eye 5.66 in head; snout 2.5; interorbital 3.4; pectoral 1.69; ventral 1.91; D. IX, 10; A. III, 9; scales $1\frac{1}{2}$–25–6 ($5\frac{1}{2}$).

Interorbital broad, flat, raised but little above upper edge of orbit; dorsal outline of head nearly straight; dorsal and ventral

outlines evenly convex; eye small; snout blunt; jaws subequal, the lower slightly included. Teeth white, free, convex, incisorlike, those in the upper jaw arranged in five oblique rows, extending upward and backward, those in front of jaw slightly irregular in arrangement, those in lower jaw in about six oblique rows extending downward and backward, these rows not having a common starting point at the symphysis, being arranged along the sides of the dental plate; no canines; upper lip double for its entire length; lips nearly covering teeth. Scales large, thin, their edges membranous; four scales on median line of back, in front of dorsal; cheek with a single row of four scales; lateral line continuous, pores numerously and widely branched; base of dorsal and anal with scaly sheath. Dorsal spines flexible, the membranous covering of spines extending into a long filament, those posteriorly becoming shorter; caudal rounded, its lower rays somewhat shortened; pectoral rounded, upper divided rays equaling middle rays in length.

Color in spirits: Slaty gray; scales on the sides and belly with a brownish tinge in the center and a lighter margin; dorsal, caudal, and anal dusky, mottled with indistinct round spots; ventrals body color; pectoral slightly lighter.

Color of specimens freshly dead, chiefly dark green above, lighter below, with a tinge of red on throat, belly, and lower part of sides, and also on the distal part of ventrals.

Comparative measurements of the paratype: Head 3.15 in length; depth 3; eye 5.54 in head; snout 2.55; interorbital 3.32; pectoral 1.66; ventral 1.84; D. IX, 10; A. III, 9; scales $1\frac{1}{2}$–25–6.

This individual has more of a brownish wash; soft dorsal membranes dusky translucent; rays with alternating brown and light areas; caudal brown with round white dots, which are smaller than eye; anal dusky; ventrals slaty; pectoral rays brownish, membranes translucent.

Family BALISTIDAE.

THE TRIGGERFISHES.

KEY TO GENERA.

a^1. Gill opening with a number of enlarged bony plates or scutes behind it; ventral flap movable, supported by a series of spines, more or less free at tip, and resembling fin rays; cheek entirely scaled, without naked grooves or patches; eye with a groove before it; scales rather small, 50 to 75 ---------- *Balistes*, p. 131.

a^2. Gill opening with only ordinary scales behind it; no enlarged plates or scutes; ventral flap scarcely movable, its surface scaled; lateral line obsolete; third dorsal spine small or wanting; vertical fins in adult more or less angulate or falcate---------- *Canthidermis*, p. 131.

Genus BALISTES (Artedi) Linnaeus.

155. BALISTES POLYLEPIS Steindachner.

PEJE-CHANCHO.

Plate 12, fig. 2.

Balistes polylepis Steindachner, Ichth. Beitr., vol. 5, 1876, p. 21, Magdalena Bay; Mazatlan; Acapulco.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 2, 1898, p. 1900.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 152.

One specimen, field No. 09472, 45 cm. long, from Lobos de Afuera, taken by fishermen in about 25 fathoms.

Head to lower end of gill slit 3.4 in length; depth 1.8; eye 5.2; snout 1.25; interorbital 2.5; pectoral 2; first dorsal spine 1.44; longest dorsal ray 1.13; longest anal ray 1.35; upper caudal ray longest, 0.95; D. III–26; A. 24; oblique rows of scales, counted downward and backward, 65, counted downward and forward, 75; scales from origin of dorsal to anal origin, 50; preocular groove prominent.

Body short and deep, dorsal and ventral outlines strongly arched; caudal peduncle slender, unarmed, its least depth 3.5 in head; upper profile of head very slightly convex; eye small, high, within 1½ diameters of origin of dorsal; eight strong teeth in each jaw; a strong groove in front of eye, its length greater than diameter of eye; plates behind gill-opening large; dorsal fin high, falcate; outer rays of caudal greatly produced, fin concave; anal triangular, anterior rays longest; pectorals small.

Color in alcohol, olive brown, darkest on back; fins dusky.

This species differs from *B. naufragium* in having 64 rows of scales counted downward and backward instead of 46 to 50; in having the preocular groove much more prominent; the small tubercle on scales less prominent; the dorsal more falcate; the caudal lobes longer; the middle rays less produced; and the coloration plainer.

Specimens from Guadalupe Island, Mazatlan, and Panama Bay have 27 or 28 dorsal and 25 or 26 anal rays. Gilbert and Starks state that the lower caudal lobe is shorter in the specimens from Panama; in our specimen the opposite is true.

Genus CANTHIDERMIS Swainson.

156. CANTHIDERMIS ADSPERSUS (Tschudi).

Balistes adspersus Tschudi, Fauna Peruana, Ichth., 1845, p. 31; Huacho.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 360.

?Canthidermis angulosus Snodgrass and Heller, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 407.

Canthidermis angulosus Kendall and Radcliffe, Shore Fishes, Agassiz-*Albatross* Eastern Pacific Expedition, Mem. Mus. Comp. Zool., vol. 35, No. 3, April, 1912, p. 164.

In Shore Fishes of the Galapagos Island (p. 407), Snodgrass and Heller describe a large example of *C. angulosus* from Cocos Island

which was unspotted. Kendall and Radcliffe, in Shore Fishes, *Albatross* Eastern Tropical Pacific Expedition (p. 164), list three very small individuals as *C. angulosus*, from station 4619, off the coast of Panama, and state that *Balistes adspersus* of Tschudi is probably the same species. These small individuals had the sides of the body dotted with small, round, white spots. The type of *Canthidermis angulosus* (Quoy and Gaimard) came from the Hawaiian Islands.

If the form found on the Pacific coast of America is found to be different from the Hawaiian species, as seems highly probable, the former would become *C. adspersus*.

For the present we have provisionally adopted this name.

The largest individual taken off the coast of Panama, 21 mm. in length, has the following measurements: Head 2.57 in length; depth 1.63; eye 3.5 in head; snout 2; pectoral 1.55; first dorsal spine 1.4; height soft dorsal 2; D. III–21; A. 20; P. 13; scales about 45; soft dorsal, anal and caudal rounded; body dark brown with numerous small, round white spots; fins yellowish.

Family TETRAODONTIDAE.

THE PUFFERS.

Genus SPHEROIDES Lacépède.

157. SPHEROIDES ANNULATUS (Jenyns).

PEJE-SAPO; TAMBORIN.

Tetrodon annulatus Jenyns, Zool. Voy. *Beagle*, 1842, p. 153; Chatham Island.—Steindachner, Ichth. Beitr., vol. 5, 1876, p. 23; Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 60; Guyaquil.

Anchisomus geometricus (Kaup) Richardson, Voyage *Herald*, 1854, p. 156, pl. 30; Galapagos Islands; not of Bloch and Schneider.

Spheroides annulatus Jordan and Evermann, Fishes of North and Mid. Amer., 1898, vol. 2, p. 1735.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 157.—Snodgrass and Heller, Shore Fishes of the Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 412.

One specimen, field No. 09563, 21.5 cm. long, from Paita, and one, field No. 1007, 22.5 cm. long, from mouth of Tumbes River, Tumbes, taken with a casting net, "ataraya."

Head 2.9 in length; depth 3.8; eye 5.63–6.8 in head; interorbital 2.15–2.3; snout 2.1–2.2; D. 8; A. 7; interorbital space broad, nearly flat; outline of snout straight or concave; head broad and short; body short and robust.

In an individual from Tumbes, in which the belly was inflated at time of death, the prickles are very distinct; these are sharp and close-set on back from front of eye backward nearly to dorsal; those on ventral surface from front of eye to vent, anteriorly extending up on side of head to level of middle of base of pectoral; rest of head, sides of body to vent and all of body behind vent without prickles.

Color in spirits of Paita example, back very dark, thickly dotted with small black spots, varying in size in different parts of the body, but those on sides larger, but always smaller than pupil; well-marked light-colored concentric rings, characteristic of the species, cross back, becoming quite indistinct on sides; the central one ovate in shape, about three-fourths inch in diameter about midway between anterior border of eye and base of caudal; three others cross back between this and the posterior border of eye; a number of irregular lines across snout; belly white; line of demarkation between color of sides and belly; fins whitish gray. In the individual from Tumbes there are fewer spots on the sides and back; and the concentric lines are indistinct.

Pacific coast of tropical America and the Galapagos Islands; generally common in sandy bays from Cerros Island to Peru; once recorded from San Diego.

Family GOBIIDAE.

THE GOBIES.

KEY TO GENERA.

a^1. Ventral fins separate; body scaly; vomer with a broad patch of villiform teeth; skull above with conspicuous elevated ridges, one of these bounding the orbit above, the orbital ridges connected posteriorly by a strong cross ridge ..... *Philypnus*, p. 133.

a^2. Ventral fins united.

b^1. Dorsal fins separate, free from caudal; upper rays of pectoral silklike; tongue emarginate ..... *Mapo*, p. 134.

b^2. Dorsal fin continuous, the soft part and the anal joined to the base of the caudal; body elongate, entirely scaled; teeth in a band; those of the outer series very strong ..... *Gobioides*, p. 134.

Genus PHILYPNUS Cuvier and Valenciennes.

THE GUAVINAS.

158. PHILYPNUS MACULATUS (Günther).

Lembus maculatus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859; Andes of Ecuador.

Philypnus lateralis GILL, Proc. Acad. Nat. Sci. Phila., 1860, p. 123; Cape San Lucas.—JORDAN and EVERMANN, Fishes of North and Mid. America, vol. 3, 1898, p. 2195.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 167.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 799; Guayaquil, Ecuador, and Eten, Peru.

Philypnus maculatus REGAN, Biologia Centrali-Americana, Pisces, p. 5, 1906, pl. 1, fig. 2.

Genus MAPO Smitt.

159. MAPO SOPORATOR (Cuvier and Valenciennes).

PEJE-GAPO.

Gobius soporator Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 12, 1837, p. 42 (56); Martinique.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 3, 1898, p. 2216.—Gilbert and Starks, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 171.

Mapo soporator Snodgrass and Heller, Shore Fishes of the Galapagos Islands, Proc. Washington Acad. Sci., vol. 6, 1905, p. 416.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 799.

Two specimens, field No. 277 (part), 10.5 and 12.4 cm. long, and two, field No. 278 (part), 6.6 and 8.3 cm. long, from Lobos de Afuera. The latter were taken from a shallow tide pool.

Head 3.3 in length; depth 5; eye 4.5 in head; snout 3.1; maxillary 2.2; interorbital 2 in eye; D. VI–I, 9; A. I, 9; 13 scales in transverse row, 33 transverse rows of scales from opercle to base of caudal.

Body robust, slightly depressed anteriorly, compressed posteriorly; head low, depressed, evenly rounded; cheeks tumid; eyes large, on upper surface of head, interorbital concave; lips thick and fleshy; mouth large, nearly horizontal; maxillary reaching a little behind vertical from anterior border of eye; teeth in jaw in broad bands, the outer row in each enlarged, tongue notched at tip; head naked. The breadth of the head varies considerably; in some of the larger specimens in which the cheeks are very tumid the breadth equals the length, in others it is considerably less.

Spinous dorsal low, the spines very weak; dorsal rays directed backward, the posterior rays long, reaching base of caudal, 1.75 in head; caudal rounded; anal similar in shape to soft dorsal, but shorter; ventrals united into a disk, reaching vent, 1.5 in head; pectoral rounded, the upper rays silk-like, longest rays 1.25 in head, ventrals united into a disk, reaching vent, 1.5 in head.

Color in spirits: A very dark olive brown, indistinctly barred with darker; cheeks and jaws with darker markings. Description based on a specimen 12.4 cm. long.

Genus GOBIOIDES Lacépède.

THE BARRITOS.

160. GOBIOIDES PERUANUS (Steindachner).

Amblyopus broussonetii Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 136; coast of Peru; not of Lacépède.

Amblyopus (*Gobioides*) *peruanus* Steindachner, Fisch-Fauna Causa und Flüsse bei Guayaquil, Denkschr. Akad. Wiss. Wien, vol. 42, 1880, p. 42 (94), pl. 2, fig. 2, 2*a*; Guayaquil.

Gobioides peruanus JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 3, 1898, p. 2264.

Gobioides peruanus ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 361.

One small specimen, field No. 09542, 8.5 cm. long, taken with a boat beam-trawl, Bay of Paita, southwest of Caleta Colan, in 7 fathoms of water, soft mud bottom; no other fishes taken here.

Head 6.29 in total length; depth 10.6; eye very small, about 13.5 in head; snout 3.85; maxillary 2.25; interorbital 3.37; caudal 4.25 in total length, confluent with dorsal and anal; D. VII, 16; A. I, 15.

Color in alcohol: Flesh colored, dusky points on back and sides with indistinct traces of about 20 darker crossbars; fins blackish; base of dorsal white.

As this small individual presents some slight differences from the current descriptions of the adult, we quote the description of this species as given by Jordan and Evermann:

"Head 5; depth 11; D. VII, 17; A. I, 16. Eye scarcely visible, much smaller than in *G. broussonetii;* scales very minute; snout 2.5 in postorbital part of head; interorbital 5 in head; lower jaw slightly projecting; maxillary 2.6 in head; a series of large slender teeth in each jaw, behind which, in each jaw, is a narrow band of fine teeth; caudal 4.33 in body, connected by membrane to dorsal and anal; sides with regular cross series of pores. Body with narrow angular crossbars; dorsal rays violet, the membrane yellowish. Shores of Ecuador and Peru, ascending rivers."

Family ECHENEIDIDAE.

THE REMORAS.

Genus ECHENEIS (Artedi) Linnaeus.

161. ECHENEIS REMORA Linnaeus.

Echeneis remora LINNAEUS, Syst. Nat., ed. 10, 1758, p. 260, in "Pelago Indico."—PHILIPPI, Peces Nuevos de Chile, Ann. Univ. Chile, vol. 93, 1896, p. 376.—JORDAN and EVERMANN, Fishes Hawaiian Islands, Bull. U. S. Fish Comm., vol. 23, pt. 1, 1903 (1905), p. 494.

Remora remora JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 3, 1898, p. 2271.—ABBOTT, Marine Fishes Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 363.—GILBERT and STARKS, Fishes Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 180.—SNODGRASS and HELLER, Shore Fishes Galapagos Islands, Proc. Washington Acad. Sci., 1905, p. 421.

Family SCORPAENIDAE.

THE ROCKFISHES.

KEY TO GENERA.

a^1. Dorsal XIII, 14 ..... *Sebastichthys*, p. 136.
a^2. Dorsal XII or XIII, 10.
  b^1. Pectoral with some of its median rays more or less branched. *Scorpaena*, p. 137.
  b^2. Pectoral rays all simple; head more or less scaly, the scales ctenoid. *Pontinus*, p. 138.

Genus SEBASTICHTHYS Gill.

KEY TO SPECIES.

a^1. D. XIII, 14; A. III, 7; gillrakers 9+21, longest 2.37 in eye ... *chamaco*, p. 136.
a^2. D. XIII, 13; A. III, 6; gillrakers 10+18, longest nearly as long as pupil. *darwini*, p. 137.

162. SEBASTICHTHYS CHAMACO, new species.

CHAMACO.

Plate 12, fig. 3.

Six specimens, field Nos. 504, 545–549, 18.5–24.8 cm. long, from Mollendo.

Type.—Cat. No. 77621, U.S.N.M. (field No. 548), a specimen 35 cm. long, from Mollendo.

Head 2.4 in length; depth 2.83; eye 4.52 in head; snout 3.9; interorbital 6.61; maxillary 2.02; fourth dorsal spine highest, 3.24; second anal spine longest and strongest, 2.77; height of anal rays 2.45; pectoral 1.36; 10 lower pectoral rays simple, thickened; D. XIII, 14; A. III, 7; scales about 48, 38 pores; accessory scales numerous on back to level of base of pectoral, below that not nearly so numerous; gillrakers 9+21; comparatively short and stout, longest 2.37 in eye; lower jaw projecting; preopercle with five stout spines, notchings very distinct; nasal, preocular, supraocular, postocular, tympanic and parietal spines strong; opercular, suprascapular and scapular spines smaller.

Dorsal spines low, shorter and more slender than the second anal spine; caudal rounded; ventrals reaching just behind anus, pectoral longer, reaching to middle of space between anus and origin of anal.

Color in alcohol, back reddish brown, becoming silvery gray below; maxillary with a dark reddish brown stripe in center; another, wider, parallel with preopercle, just above maxillary; indistinct traces of two more behind eyes; five dark reddish brown saddles on back scarcely reaching lateral line; the first at origin of dorsal; second under fifth to sixth dorsal spines; third under ninth to

twelfth dorsal spines; fourth under third to tenth soft rays; fifth crossing caudal peduncle; some of the scales on dark area silver gray; membrane between seventh and eighth dorsal rays reddish brown; fine grayish; a brownish area on base of pectoral.

Paratypes have head 2.23–2.4 in length; depth 2.5–3; eye 4.05–4.52 in head; snout 4–4.3; interorbital 6–6.81; maxillary 2.02–2.13; highest dorsal spine 3.24–3.37; second anal spine 2.2–2.77; simple pectoral rays 9 or 10; D. XIII, 14; A. III, 7.

The dark reddish brown saddles on the back are wider than the silvery gray interspaces; midway between base of dorsal and lateral line the second and third saddles are connected by scales of same color; below this the scales are light silvery gray, giving the appearance of a light spot similar to the one in *S. oculata*, which, however, has it between the first and second light spots on the back.

This species has the spines of head weaker than *S. oculata;* the dorsal spines stronger, and the body shorter and thicker.

163. SEBASTICHTHYS DARWINI (Cramer).

? Sebastes oculata JENYNS, Zool. Voy. *Beagle*, Fishes, 1848, p. 37; Valparaiso.

Sebastes darwini CRAMER, Proc. California Acad. Sci., 1896, p. 240; Mexillones, Peru.

Sebastodes darwini JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1832.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 360.—DELFIN, Cat. Peces de Chile, 1901, p. 79.

Genus SCORPAENA (Artedi) Linnaeus.

THE SCORPION FISHES.

164. SCORPAENA HISTRIO Jenyns.

PARLAMO; PEJE-DIABLO.

Scorpaena histrio JENYNS, Zool. Voy. *Beagle*, Fishes, 1842, p. 35, pl. 8; Chatham Island, Galapagos Archipelago.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 115.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 1843.—STEINDACHNER, Fauna Chilensis, 1898, p. 293.—DELFIN, Cat. Peces de Chile, 1901, p. 79.

One example, field No. 09497, 19.8 cm. long, from Lobos de Afuera.

Head 2.3 in length; depth 3; eye 4.3 in head; snout 3.38; maxillary 2.06; D. XII, 10; A. III, 5; tubes of lateral line 26.

Head large, its width equaling its depth; interorbital space narrow, deeply concave; its depth about one-half width, which is 2.06 in eye; nasal spines small, sharp; preocular ridges very prominent, spines stout; supraocular spines short, stout, blunt; postocular spines moderate; a broad deep pit on occiput; preorbital broad, without prominent ridges, a shallow depression under eye; sub-

orbital ridge equidistant from eye and maxillary, grooved, ending in a small spine posteriorly; preopercular spines 4, moderate, the upper of which lies just below and posterior to suborbital spine, longest; opercle ending in two strong, flat, divergent spines; mouth very large, horizontal; maxillary reaching to below posterior border of eye; jaws equal; broad bands of teeth on jaws, vomer and palatines; pseudobranchiae large. Scales moderate, cycloid, those on breast very small; area under suborbital ridge and on opercle above preopercular spine scaly, rest of head naked. Dorsal spines moderate, the third longest, 2.9 in head, equal to longest dorsal ray; caudal moderate, rounded, 2 in head; anal spines stout, second longest, equal to longest dorsal spine; anal rays long, 2.33; ventrals moderate, reaching anus, a little over 2 in head; pectoral broad, of 20 rays, the first and 12 lower rays unbranched. the lower rays somewhat thickened, length 1.48 in head.

Color in alcohol, head dark reddish brown, darkest on opercle; ventral surface on head creamy, tinged in places with rosy; back and sides brownish red, becoming creamy white on belly; sides with traces of four wide indistinct cross-bars; ventrals color of belly, dusky at tips, other fins mottled; two dark mottled cross bands on caudal and three on pectoral.

This species is closely related to *Scorpaena pannosa* Cramer, from Panama.

Panama to Juan Fernandez and Galapagos Archipelago.

Genus PONTINUS Poey.

165. PONTINUS DUBIUS Steindachner.

PUNAL.

Pontinus dubius Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien., vol. 72, 1902, p. 36, pl. 3, fig. 1; Paita, Peru.

One example, No. 09549, 16.1 cm. long, from Paita, the type locality of the species.

As stated by Steindachner, this species is very close to *P. furcirhinus* Garman and needs comparison with the type of that species. The individuals from Paita are slenderer, have the greatest depth of body at origin of dorsal, and present certain minor differences which may not be apparent when compared with a larger number of individuals.

Head 2.26 in length; depth 3.23; eye equaling snout, which is 3.63 in head; maxillary 2, reaching to below posterior border of orbit; interorbital narrow, deeply concave, its width 2.35 in orbit; pectoral base nearly equal to orbit in breadth, its length 1.39 in head; pectoral rays 18, simple, projecting beyond membrane; ven-

trals extending to posterior border of vent, 1.76 in head; first dorsal spine 1.55 in second, second 1.75 in third which is the longest, 1.71 in head; eleventh dorsal spine short, 1.23 in twelfth which is 3.75 in head; soft dorsal 2.4; second anal spine strong, longer than third, 2 in head; D. XII, 10; A. III, 6; scales ctenoid, easily detached (nearly all gone in specimen), 26 pores in lateral line; scales on cheeks, opercles, suborbital and nape, these replaced anteriorly on snout, interorbital and preorbital by small rudimentary scales or prickles; bands of villiform teeth on jaws, vomer and palatines; premaxillaries widely separated; symphyseal knob of upper jaw very prominent.

Head comparatively smooth; spines compressed, knife-like; nasal spines small; preocular, supraocular, postocular, tympanic, and occipital spines moderate; paroccipital ridge containing a single small spine immediately behind eye and another somewhat larger one at its posterior extremity; suborbital ridge strong, with four sharp spines; margin of preorbital with two strong diverging spines; upper spine of preopercle very strong, curved outward, slightly below suborbital ridge and with a small spine at its base; three other preopercular spines below this, the middle one the stronger; no pit on occiput or below front of eye; no transverse ridge at end of interorbital space; opercle with two diverging spines. Some of the spines on crown of head near filaments; nostrils small, the anterior the smaller, with a small tube and a long fringed dermal flap.

Color in alcohol, light yellow, possibly red in life; fins yellowish, tinged with pink; soft dorsal and caudal rays spotted with black; tips of caudal and ventrals blackish; a few blackish spots in center of pectoral; traces of blackish areas on base of spinous and soft dorsal, these probably continued onto body, the loss of the scales making it impossible to determine their extent.

Pontinus strigatus Heller and Snodgrass from Galapagos Islands is closely related to this species.

Family AGRIOPODIDAE.

Genus AGRIOPUS [1] Cuvier and Valenciennes.

166. AGRIOPUS PERUVIANUS Cuvier and Valenciennes.

Agriopus peruvianus Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 4, 1829, p. 286 (389); San Lorenzo Island near Lima.—Guichenot in Gay. Hist. Chile, Zool., vol. 2, 1848, p. 181, I, Atlas, Zool. Ictiol., pl. 2bis, fig. 1, 1854.—Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 138.—Steindachner, Fauna Chilensis, 1898, p. 297.—Delfin, Cat. Peces de Chile, 1901, p. 80.

Agriopus peruanus Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 361.

[1] Because of the uncertainty regarding the author of the genus *Congiopodus* (see Günther, Proc. Zool. Soc. London, 1871, p. 659), we have retained the generic name *Agriopus*.

Family PLEURONECTIDAE.

THE FLOUNDERS.

Subfamily HIPPOGLOSSINAE.

THE HALIBUTS.

Genus PARALICHTHYS Girard.

KEY TO SPECIES.

a^1. Gillrakers 6 to 8+16 to 18; scales ctenoid.....*adspersus*, p. 140.
a^2. Gillrakers 4 or 5+11 to 13; scales cycloid.....*woolmani*, p. 140.

167. PARALICHTHYS ADSPERSUS (Steindachner).

LENGUADO.

Pseudorhombus adspersus STEINDACHNER, Ichth. Notizen, vol. 5, 1867, p. 9, pl. 2; Chinchas Islands.

Paralichthys adspersus JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 2, 1898, p. 2627.—ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 363.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 800.

Two specimens, field No. 419, 24 and 27.3 cm. in length; two, field Nos. 09575–6, respectively 25 and 25.3 cm. in length, from Callao; and one, No. 501, 24.5 cm. in length, from Mollendo.

Head 3.18 to 3.21 in length; depth 2.18; snout to upper eye 3.65 in head; maxillary extending beyond vertical from posterior border of eye; 2.2 to 2.3; upper eye 6.5 to 7; interorbital 1.4 to 1.6 in eye; D. 67 to 72; A. 55 to 59; gillrakers 6 to 8+16 to 18; P. 12; V. 6; scales about 110; mouth large; teeth long and sharp, slightly incurved; jaws subequal; dorsal and anal of equal height, longest rays 2.8 to 2.85 in head; caudal double concave, middle rays longest, 1.45 to 1.5; breadth of caudal peduncle 2.8; ventrals small, 3.25 to 3.6; pectorals 2.05 to 2.12; scales ctenoid, very rough; snout and mandible without scales; a few scales on maxillary; rays of fins broadly scaled, membranes naked; lateral line strongly arched, the chord of the arch 2.25 to 2.5 in head, 3.5 to 4 in straight part of lateral line.

Color in alcohol, coloration variable, brown or brownish gray; fins mottled; body thickly covered with dark spots, rings and dots or quite plain.

168. PARALICHTHYS WOOLMANI Jordan and Williams.

LENGUADO.

Paralichthys woolmani JORDAN and WILLIAMS, Proc. U. S. Nat. Mus., 1896, p. 457; Panama, erroneously credited to Galapagos Islands.—JORDAN and EVERMANN, Fishes North and Mid. Amer., vol. 3, 1898, p. 2628.—GILBERT and STARKS, Fishes of Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 197.

Paralichthys sinaloae JORDAN and ABBOTT in Jordan and Evermann, Fishes of North and Mid. Amer., vol. 3, 1898, p. 2872; Mazatlan and La Paz.

One specimen, field No. 09561, 42.4 cm. in length, from Paita.

Head, including opercular membrane, 3.16 in length to base of caudal; depth 2.15; snout to upper eye 4.54 in head; maxillary broad, extending slightly beyond vertical from posterior border of eye, 2.27 in head; upper eye 7.5 in head; interorbital rather broad, 1.4 in eye; D. 70; A. 57; gillrakers 4+13; scales about 100.

Caudal peduncle broad, 2.53 in head; dorsal high, longest dorsal ray equaling longest anal ray, 2.86; middle rays of caudal longest, 1.37; ventrals small, inserted under posterior preopercular margin, 3.4; pectoral longer than ventrals, 1.98; scales cycloid, small anteriorly, becoming larger posteriorly; arch of lateral line very high, chord of arch 1.9 in head, 3.5 in straight part of lateral line.

Color in alcohol, dark chocolate brown; fins mottled.

This species closely resembles *P. dispersus* from which it may be distinguished by the cycloid scales and the fewer gillrakers which are stronger, farther apart and armed with coarser teeth on their inner edge.

Subfamily Psettinae.

THE TURBOTS.

Genus CITHARICHTHYS Bleeker.

169. CITHARICHTHYS GILBERTI Jenkins and Evermann.

TAPADERO.

Citharichthys gilberti Jenkins and Evermann, Proc. U. S. Nat. Mus., 1888, p. 157; Guaymas, Mexico.—Jordan and Evermann, Fishes North and Mid. Amer., vol. 3, 1898, p. 2686.—Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 45; Guayaquil.—Gilbert and Starks, Fishes Panama Bay, Mem. California Acad. Sci., vol. 4, 1904, p. 200.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 800; Guayaquil.

Two specimens, field No. 1004, 17 and 21.5 cm. long, from Tumbes, taken with a casting net at the mouth of the Tumbes River.

Head 3.78 in length; depth of body 2.17; D. 89; A. 68; scales 44(2).

Snout without spine 4.27 in head (measured from upper eye); eyes equal, 5.87 in head; interorbital space very narrow, 2.66 in eye, slightly grooved and scaled on posterior portion only; maxillary 2.54 in head, reaching to posterior border of pupil; jaws subequal, the upper slightly projecting; teeth small, in a single series; gillrakers slender, 6+14, the longest 2.28 in eye; dorsal beginning in advance of eye, highest ray 2.76 in head; pectorals unequal, the one on eyed side 1.78 and the other 2.47 in head; ventrals 3.13; highest anal ray

2.47; length of caudal 1.3; scales large, ciliated, those on anterior part of body and near margins of disk becoming smaller.

Color in alcohol, dark brown with traces of darker spots; the rays of the fins with darker markings; lower surface yellowish, scales with silvery centers, which tend to form longitudinal lines along the rows of scales.

D. 86; A. 67 in smaller individual.

This species occurs on the Pacific coast of tropical America and is abundant in sandy bays from Guaymas to Panama, ascending all the streams. (Jordan and Evermann.)

Starks states that an example from Guayaquil was very dark in color but otherwise not different from specimens from Panama. Steindachner gives the fin counts for two specimens from the same locality, D. 84; A. 63. This is a greater number than is recorded for northern individuals. Our specimens have more dorsal and anal rays, a little slenderer body, and a slightly shorter head and maxillary, otherwise they agree very well with the type.

Genus ETROPUS Jordan and Gilbert.

170. ETROPUS ECTENES Jordan.

Etropus ectenes JORDAN in JORDAN and GOSS, Rev. Flounders, Rep. U. S. Fish Comm., 1886 (1889), p. 277; Callao, Peru.—ABBOTT, Marine Fishes Peru. Proc. Acad. Nat. Sci. Phila., 1899, p. 364.

Family BLENNIIDAE.

THE BLENNIES.

KEY TO GENERA.

a^1. Body scaly; teeth in jaws in more than one row; a band of villiform teeth behind outer enlarged row; teeth on the vomer and palate_____ *Lepisoma*, p. 143.

a^2. Body scaleless.

b^1. Teeth comb-shaped, in a single row in each jaw.

c^1. Teeth all fixed, attached to the bones of the jaw and not movable.

d^1. Gill membranes free from the isthmus or at least forming a distinct fold across it_____ *Blennius*, p. 146.

d^2. Gill membranes broadly united to the isthmus, the gill openings restricted to the sides_____ *Hypleurochilus*, p. 146.

c^2. Teeth of front of jaws all movable, implanted on the skin of the lips.

c^1. Posterior canines present in one or both jaws_____ *Altieus*, p. 146.

c^2. Jaws without posterior canines_____ *Salarias*, p. 147.

b^2. Teeth unequal, not comblike; a single series of strong, blunt conical teeth on jaws, vomer and palatines_____ *Emblemaria*, p. 147.

Genus LEPISOMA DeKay.

KEY TO SPECIES.

a^1. D. XVII–XIX, 11–13; A. II, 19–21.
  b^1. Color variable, typical examples with brown or black spots and dark cross-bands.
    c^1. Scales (pores) about 65; an outer row of enlarged conical canines intermingled with small teeth on vomer and palatines; normal fin counts D. XVIII, 12 or 13; A. II, 19 ..... *xanti*, p. 143.
    c^2. Scales (pores) 69 to 73; teeth on vomer and palatines in three patches, teeth of each patch of nearly uniform size; normal fin counts D. XIX, 13; A. II, 19 or 20 ..... *philippi*, p. 144.
  b^2. Color plain blackish brown or grayish brown ..... *peruviana*, p. 145.
a^2. D. XXV or XXVI, 11 or 12; A. II, 22 or 23 ..... *microcirrhis*, p. 146.

171. LEPISOMA XANTI (Gill).

TRAMBOLLO.

Labrosomus xanti Gill, Proc. Acad. Nat. Sci. Phila., 1860, p. 107; Cerro Blanco.

Labrisomus xanti Jordan and Evermann, Fishes North and Mid. Amer., vol. 3, 1898, p. 2362.

One specimen, field No. 09498, 14.2 cm. in length, from Lobos de Afuera.

Head 3.15 in length; depth 3.74; eye 5.1 in head; snout 3.54; maxillary 2.15; interorbital 7.8; pectoral 1.26; D. XVII, 13; A. II, 19; scales (pores) 65.

Body compressed; head somewhat pointed, not so robust as in the types without scales; mouth large, the maxillary reaching vertical from center of eye; jaws with an outer row of enlarged canine-like teeth, those on sides becoming gradually smaller; behind these are bands of villiform teeth; teeth on vomer in a $\wedge$-shaped area, main series with 4 enlarged canines, between and behind which are smaller teeth; a patch of teeth on each palatine bone as in the type except that the outer series consists of smaller teeth, more nearly equaling in size those behind them; nuchal filaments well developed.

Dorsal spines of nearly uniform height, shorter than the soft rays, membrane of last ray practically reaching base of caudal; caudal small, rounded, of about 14 rays; insertion of anal midway between tip of snout and base of caudal, posterior rays longest; ventrals narrow, 1.5 in head; pectoral broad.

Color in alcohol (much faded) brownish, without spots, showing none of the characteristic markings of the species in its present condition.

172. LEPISOMA PHILIPPI (Steindachner).

TRAMBOLLO; CHALAPO.

Plate 13, fig. 1.

Clinus philippi STEINDACHNER, Ichth. Notizen, III, Sitz. Akad. Wiss. Wien, vol. 53, 1866, p. 210; West Coast of South America.

Clinus fortidentatus COPE, Proc. Amer. Philos. Soc., 1877, p. 42; Callao, Peru.

Labrisomus philippi ABBOTT, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 361.—DELFIN, Cat. Peces de Chile, 1901, p. 94.—STARKS, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 800; Callao.

Three specimens, field Nos. 09121, 09124, and 09126, respectively 26.5, 22, and 17 cm. in length, from Callao, Lima market, and fish hucksters; two, field Nos. 474 and 475 (=09719), respectively 24.5 and 29 cm. in length, from Ballestas Island, region of Pisco, taken with a trammel net (trasmalla) in 1–3 fathoms; one, field No. 09594, 22.2 cm. in length from Chincha Island; and one, field No. 09638, 11.2 cm. in length, from Independencia Bay, Isle Vieja, Santa Rosa Island, east side. The common name for this species in this locality is "Chalapo," probably a corruption of "Chalaco"; one specimen, field No. 09668, 31.5 cm. in length from Chimbote, taken in a trap in water 2½ fathoms, near shore.

Head 2.85 to 3.15 in length; depth 3.05 to 3.6; eye 4.8 to 5.6 in head; snout 2.5 to 3.3; maxillary 2 to 2.75; interorbital 5.3 to 6.9; pectoral 1.25 to 1.45; D. XIX, 12 or 13; A. II, 19 or 20; scales (pores) 70–73.

Body compressed, tapering; head in the adult very robust, its breadth ranging from about 2.2 in head in specimen 11 cm. in length to 1.3 in specimens 30 cm. in length; snout, in the adult, blunt, maxillary reaching to vertical from posterior border of pupil; teeth essentially as in *L. xanti* except that those on the vomer and palate are in well-developed patches, and with the exception of the Chimbote specimen, the northernmost example in our collection, the teeth are of much more uniform size without unusually large teeth scattered among the smaller ones. In the example from Chimbote, the teeth approach closely the condition found in *L. xanti.* Interorbital rounded; nostrils small, the anterior with a multifid dermal flap, other similar dermal flaps over eye and on nape, the latter well developed; gillrakers short, 3+7; origin of dorsal over posterior margin of preopercle, spinous dorsal considerably lower than soft portion; caudal nearly truncate; membranes of anal deeply incised; ventrals moderate, about 2 in head.

Coloration in spirits of typical examples, brownish, tinged with yellow on belly; body crossed by six broad black crossbands, the dark bands continued across dorsal fins; several indistinct dark streaks radiating downward and backward from eye; head, body, and fins mottled with black or dark brown spots.

In other examples, the coloration is very dark and there are no traces of crossbands or spots; in others, the spots are distinct only on the head. In some of the specimens there is a very distinct black area on anterior part of spinous dorsal, similar to that found in the types of *L. xanti.*

Color in life of "Chalapo": Body very dark, covered with spots which are almost black, on dusky olivaceous background (Coker).

From a comparison of the type of *L. xanti* with examples of this species and an example of *L. jenkinsi* from the Galapagos Islands, it appears that the differences among the three species are very slight, if they do not actually intergrade. The typical color pattern for each is the same.

The fin-counts of examples of each are as follows: *L. xanti* (type) D. XVIII, 13; A. II, 19; of 12 specimens from San Lucas, one has D. XVII, 12; five have D. XVIII, 12, and five have D. XIX, 12; anal uniformly II, 19. One example from Lobos de Afuera in our collection, D. XVIII, 13; A. II, 19. *L. jenkinsi* (type and paratypes reported for three specimens) D. XIX, 11 or 12; A. II, 17 or 18; one specimen examined by us D. XIX, 11; A. II, 18.

L. philippi.—Of 8 specimens in our collection, seven have D. XIX, 13; A. II, 20; one has D. XIX, 12; A. II, 20. Of six specimens from Callao, Starks reports four with D. XIX, 13; A. II, 19; one with D. XIX, 12; A. II, 19 and one with D. XVIII, 13; A. II, 18.

L. jenkinsi has 55 to 61 pores in the lateral line, *L. xanti* has about 65, and *L. philippi* 69 to 73.

L. jenkinsi and *L. xanti* have an outer row of stout, canine-like teeth on vomer and palatines, intermingled with smaller teeth (in some cases only visible by a glass of quite high magnification). In *L. philippi*, with the exception of the northernmost representative, the vomerine teeth are in well defined patches and are usually of more nearly uniform size.

173. LEPISOMA PERUVIANA (Cuvier and Valenciennes).

Clinus peruvianus Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 11, 1836, p. 283 (383); no locality given.

Auchenionchus crinitus Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 361; not of Jenyns.

The description of this species, based on a drawing by Feuillée, is too incomplete for certain identification. Because of its close resemblance to *L. variolosus* some authors have considered it identical

with *L. crinitus* of Jenyns, but if we accept the number of fin-rays as given in the original description, the description agrees equally well with *L. philippi*, the commonest species on the coast of Peru.

174. LEPISOMA MICROCIRRHIS (Cuvier and Valenciennes).

Clinus microcirrhis Cuvier and Valenciennes, Hist. Nat. Poiss., vol. 11, 1836, p. 284 (384); Valparaiso.—Gay, Hist. Chile, Zool., vol. 2, 1848, p. 275.—Cope, Proc. Amer. Philos. Soc., vol. 17, 1877, p. 42.—Delfin, Cat. Peces de Chile, 1901, p. 95.

Clinus microcirrus Philippi, Ann. Univ. Chile, vol. 93, 1896, p. 379.

Labrisomus microcirrhis Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 362.

The presence of palatine teeth and the close similarity of the species to *L. variolosus* indicate that this species undoubtedly belongs to the genus *Lepisoma*. It is recorded from the coasts of Peru and Chile.

Genus BLENNIUS (Artedi) Linnaeus.

175. BLENNIUS TETRANEMUS Cope.

Blennius tetranemus Cope, Proc. Amer. Philos. Soc., vol. 17, 1877, p. 42 (26); Pacasmayo Bay.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 362.

Genus HYPLEUROCHILUS Gill.

176. HYPLEUROCHILUS PAYTENSIS (Steindachner).

Blennius (*Hypleurochilus*) *paytensis* Steindachner, Ichth. Beitr., V, Sitz. Akad. Wiss. Wien, vol. 74, 1876, p. 171; Paita, Peru.

Hypleurochilus paytensis Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 362.—Starks, Fishes from Ecuador and Peru, Proc. U. S. Nat. Mus., vol. 30, 1906, p. 800.

Starks records two specimens from Paita, the type-locality; these had 20 anal rays (one fewer than described for the type) and 17 and 15 dorsal rays, respectively (the type had 17).

Genus ALTICUS (Commerson) Lacépède.

177. ALTICUS GIGAS (Steindachner).

BORACHO; TORO.

Salarias gigas Steindachner, Ichth. Beitr., V, Sitz. Akad. Wiss. Wien, vol. 74, 1876, p. 172; Callao.—Steindachner, Fauna Chilensis, 1898, p. 309, pl. 19, fig. 7, 7*a*.—Delfin, Cat. Peces de Chile, 1901, p. 92.

Scartichthys gigas Abbott, Proc. Acad. Nat. Sci. Phila., 1899, p. 361.

One specimen, field No. 09602, 24 cm. long, from Chincha Island; very common among the rocks along the shore; one, field No. 474 (part), 24 cm. long, from Ballestas Island, region of Pisco, taken with a trammel net, fishing in 1–3 fathoms; one, field No. 09638 (part), 10.4 cm. long, from Isla Vieja, Independencia Bay, east side Santa Rosa Island; one, field No. 09484, 18 cm. long; one, field No.

277 (part), 8.4 cm. long, and two, field No. 278 (part), 5. 7 and 6.6 cm. long, from Lobos de Afuera; and one, field No. 120, 3 cm. long, from Chimbote, taken in a trap at the north end of Ferrol Bay, near shore.

Head 3.63 (4.44 in total) in length; depth 3.25 (4); eye 6 in head; snout 2.45; interorbital 4.5; ocular tentacle longer than eye, 3.6; maxillary 2.57; pectoral nearly as long as head; D. XI, 1, 18; A. 20.

Body robust anteriorly, compressed posteriorly, caudal peduncle 2.7 in head; head short, cheeks tumid; snout short, very steep; interorbital flat; a slight depression behind eye; lips fleshy, upper lip fringed; mouth horizontal, maxillary extending to below anterior border of eye; teeth fine, villiform, movable, forming an edge; lower jaw with strong canines.

Spinous dorsal originating above posterior border of opercle; dorsals high, separated by a notch, longest dorsal spine 2.34 in head, longest ray 1.8; caudal rounded; membranes between rays of anal deeply incised; lateral line strongly arched anteriorly, becoming straight under third dorsal ray.

Color in life, rich, deep dark red with green reticulations; the green quite evident below but barely distinguishable above. Just posterior to tips of most of the spines of the dorsal and anterior rays of soft dorsal are narrow red spots, long in a vertical direction.

This species differs from the "Trambollo" (*Lepisoma xanti*) in being lighter, with more green, and the spots are reddish. This description is based on a specimen 24 cm. long from Chincha Island.

In the other specimens the rays of dorsal are 17 or 18. The posterior canines, characteristic of the genus *Alticus*, are present in all.

Genus SALARIAS Cuvier.

178. SALARIAS RUBROPUNCTATUS Cuvier and Valenciennes.

Salarias rubropunctatus Cuvier and Valenciennes, Hist Nat. Poiss., vol. 11, 1836, p. 348; Juan Fernandez.—Gay, Hist. Chile, Zool., vol. 2, 1848, p. 271.—Steindachner, Fauna Chilensis, 1898, p. 309.

Scartichthys rubropunctatus Jordan and Evermann, Fishes North and Mid. Amer., vol. 3, 1898, p. 2396; Callao.—Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 362.

Coast of Peru and Chile, north to Panama.

Genus EMBLEMARIA Jordan and Gilbert.

179. EMBLEMARIA HUDSONI, new species.

TRAMBOLLO.

Plate 13, fig. 2.

Nine specimens, field No. 09537, 3.7 to 7.7 cm. long, from Sechura Bay, between Bayova and Matacaballa, taken in dredge with shellfish at 5–6 fathoms.

Type.—Cat. No. 77535, U.S.N.M., 7.7 cm. long, has head 3.9 in length; depth 5.66; eye 4.5 in head; snout 4.5; maxillary 2.12; ocular cirrus 2.42; D. XXII, 16; A. 27: pectoral, 1.41; ventrals long, equal to head.

Body compressed; snout evenly decurved; mouth large, horizontal; maxillary extending about three-fourths diameter of eye behind posterior border of orbit; teeth in each jaw in a single row, stout, conical; those on palatines in a single row, conical, stronger than those on jaws; several smaller teeth on vomer, separated from those on palatine bones by a short interspace.

First dorsal inserted slightly behind vertical from posterior border of maxillary, spines long and very flexible, filiform, their tips not reaching beyond the membranes, fourth spine longest, equal to length of head; soft dorsal and anal confluent with the caudal; caudal rounded; 13 rays in pectoral; membrane in front of first dorsal spine, notched.

Color in alcohol, dusky brown with purplish reflections, traces of 7 darker cross-bars, bordered with narrow yellowish white lines, these lines scarcely discernible in the type, very distinct in some of the smaller specimens; spinous dorsal with dusky shades anteriorly and other dark shades at base of membranes of alternate spines, posteriorly; soft dorsal and caudal rays yellowish, membranes translucent; anal dusky, anterior half margined with black; ventrals dark; pectorals similar to caudal; ocular cirrus yellowish.

The paratypes have D. XXII–XXIII, 15–16. In some the ocular cirrus is half as long as head. Some of these have the underside of the head crossed by 4 dark cross-bands, a dark purplish area behind eye on cheek and another on opercle near nape; the yellow cross-lines on body very distinct. In the smallest individual the crossbands are broken into two longitudinal rows of dark areas, the upper row along base of dorsal of the shape of a figure 8, the lower row V-shaped.

An examination of the type of *E. nivipes* and of these specimens shows that the generic description as given by Jordan and Gilbert must be revised. The dorsal and anal are confluent with the caudal in both these species, and in neither are the teeth on vomer and palatines continuous. There is a single row of stout conical teeth on the palatines, then an interspace, and 2 or 3 smaller teeth on the vomer.

We take pleasure in naming this new species for our friend, Capt. Charles Bradford Hudson, artist and author, who has succeeded better than any other in depicting on canvas the life colors of American fishes.

Family OPHIDIIDAE.

THE CUSK EELS.

Genus GENYPTERUS Philippi.

KEY TO SPECIES.

a^1. Head 4.25 to 4.5 in total length. Back and sides dark chocolate brown, with a few light spots irregular in form and disposition; belly light of color, washed with salmon ..... *blacodes*, p. 149.

a^2. Head 3.63 to 4 in total length. General color light chocolate brown, with very conspicuous hieroglyphic-like white markings over entire body and fins, these somewhat irregular in form and arrangement, but very characteristic in appearance ..... *chilensis*, p. 150.

180. GENYPTERUS BLACODES (Bloch and Schneider).

CONGRIO COLORADO.

Ophidium blacodes Bloch and Schneider, Syst. Ichth., 1810, p. 484.—Cuvier, Règne Anim., ed. 2, vol. 2, 1829, p. 359.

Ophidium blancodes Tschudi, Fauna Peruana, Ichth., 1845, p. 29.

Ophidium maculatum Tschudi, Fauna Peruana, Ichth., 1845, pl. 5.

Genypterus blacodes Günther, Cat. Fish. Brit. Mus., vol. 4, 1862, p. 379.—Delfin, Cat. Peces de Chile, 1901, p. 99.—Steindachner, Herpet.-ichthyol., Ergebnisse einer Reise nach Südamerika, Denkschr. Akad. Wiss. Wien, vol. 72, 1902, p. 47.—Delfin, Los Congrios de Chile, p. 189, pl. 13, fig. 2; Rev. Chilena Hist. Nat., No. 3, Año VII, June, 1903.

Two specimens, field Nos. 09707–8, respectively, 51 and 46.5 cm. in length, from Mollendo, taken with a trawl line in 46 fathoms not far from shore.

Head 4.25 to 4.5 in total length; depth 6.65 to 6.7; snout 4.25 to 4.6 in head; postorbital part of head 1.5; eye 7.25 to 8.5; interorbital 5.1 to 6.65; breadth of head 2.2; pectoral 2.06 to 2.12; breadth of pectoral base 4.6 to 4.8; maxillary 2.2 to 2.35.

Body elongate, tapering, compressed, greatest depth over base of pectoral; head elongate; snout blunt; lower jaw included; maxillary reaching beyond posterior border of eye by a distance nearly equal to its horizontal diameter; an enlarged outer row of stout, slightly incurved canine-like teeth in jaws, behind these narrow bands of smaller teeth, those in upper jaw in several rows in front, narrowing to a single row posteriorly, those in lower jaw mainly in one row; an outer row of enlarged teeth on vomer and palatines, similar to those on jaws; behind these an irregular row of smaller teeth; eyes small, anterior in position; nostrils small, separated by an interspace equal to one-half diameter of eye, the first provided with a small flap.

Distance from tip of snout to origin of dorsal 3.65 to 4 in total length; dorsal and anal low, confluent with the caudal; ventrals

filamentous, bifid, inserted at throat, under anterior half of eye; distance from tip of snout to vent 2.2 to 2.25 in total length.

Color in alcohol, back, sides, and fins slaty; ventral surface of head and belly anteriorly sulphur-yellow, becoming dusky posteriorly; sides with small irregular sulphur-yellow spots, very irregular in arrangement: pectorals with traces of spots, margined with sulphur-yellow.

Color in life, ventral aspect of head and abdomen light, unevenly washed with salmon; upper and lower lips deep salmon; the salmon-color of ventral surface extending backward along the base of anal fin; body dark chocolate brown, darkest above, with a few light spots, irregular in form and disposition: these spots smaller, more irregular in form and distribution and more sharply contrasted with the darker ground color, than those of the common congrio (*G. chilensis*). In the latter, the light markings, while somewhat irregular in form and arrangement, are yet very characteristic in appearance, being evenly distributed and tending to certain forms—circles, hour-glasses, etc. The circles may be complete or incomplete, entirely of a light color or with brown centers. Some of the congrios, at least, show a bronze tint on the sides.

181. GENYPTERUS CHILENSIS (Guichenot).

CONGRIO; CHACHA.

Conger chilensis Guichenot in Gay, Hist. Chile, Zool., vol. 2, 1848, p. 339.

Genypterus nigricans Philippi, Ann. Univ. Chile, vol. 19, 1857, p. 185; Wiegm. Arch. Naturg., 1857, p. 629.

Genypterus chilensis Günther, Cat. Fish. Brit. Mus., vol. 4, 1862, p. 380.—Abbott, Proc. Acad. Nat. Sci. Phila., 1899, p. 475.—Delfin, Cat. Peces de Chile, 1901, p. 99; Los Congrios de Chile, p. 189, pl. 13, fig. 1; Rev. Chilena Hist. Nat., No. 3, Año VII, June, 1903.

One specimen, field No. 09722, 65.5 cm. long, from Guanape North Island; one, field No. 09717, 48 cm. long, from Pisco; and three, field Nos. 09703, 08713, and 522, respectively 39.5, 36.5, and 36.5 cm. long, from Mollendo.

Head 3.68 to 4 in total length; depth 5.45 to 7.44; snout 4.14 to 4.95 in head; postorbital part of head 1.42 to 1.5; eye 7.46 to 9.36; breadth of head 1.76 to 2.67; interorbital 5.23 to 5.5; maxillary 2.33 to 2.6; length of pectoral 1.88 to 2.09; breadth of base of pectoral 5.05 to 5.25; distance from tip of snout to origin of dorsal 3.3 to 3.65; distance from tip of snout to anal 2.11 to 2.29; ventrals much shorter than head, not split to base. In form this species agrees with *G. blacodes*.

Color in life, general color light chocolate-brown, with very conspicuous hieroglyphic-like white markings over entire body; while these are somewhat irregular in form and arrangement, they are still very characteristic in appearance, are evenly distributed, and

tend to certain forms, as circles, oblongs, horseshoes, hourglasses, etc. These may be entirely of a light color or with brown centers.

This form is readily distinguished from the preceding by the coloration. In *G. blacodes*, the spots on the sides are much smaller and the under surface of the head and belly is abruptly sulphur-yellow, while in *G. chilensis* the ground color of the ventral surface resembles that of the sides and back, except that it is lighter and the hieroglyphic markings are continued on to the fins.

Aside from the striking differences in coloration, this species differs little from *G. blacodes*. A comparison of the measurements of our specimens and those given by Delfin seems to indicate that the head is a little longer, the average length of the maxillary and diameter of the eye less and the width of the interorbital greater in this species than in *G. blacodes*.

Family BROTULIDAE.

Genus BROTULA Cuvier.

182. BROTULA MACULATA, new species.

CONGRIO.

Plate 13, fig. 3.

Type.—Cat. No. 77702, U. S. Nat. Mus. (field No. 09551), 44 cm. long, from Paita.

Head 4.08 in total length; depth 6.1; eye 6 in head; snout 4.8; maxillary 2.25; pectoral 2.16; ventrals 2.4; D. 105; A. 91; P. 25; scales about 26–220–68; interorbital narrower than eye, 6.35 in head; origin of dorsal slightly behind base of pectoral, its distance from tip of snout 3.92 in total length; vent cephalad of middle of body, its distance from tip of snout 2.25 in total length.

Body elongate, compressed, not so deep as in related species; mouth large, oblique, jaws nearly equal, the lower slightly projecting; maxillary long, reaching a distance of more than one-half orbit behind eye, its upper edge slipping under broad orbital bones, its expanded posterior extremity equal to interorbital width, 6.35 in head; anterior nostril without flap, posterior nostril with a slender barbel about two-thirds length of orbit; two barbels on each side of fleshy upper lip anteriorly; six barbels on under surface of head: all the barbels slender and rather short, the longest barely greater than diameter of eye; jaws, vomer, and palatines with narrow bands of minute teeth; tongue very thick, free, and pointed anteriorly; gill-opening large; isthmus narrow, grooved; gillrakers short, rather stout; pseudobranchiæ well developed; opercle with a sharp stout spine above; body, head, and fins covered with embedded, minute, cycloid scales;

maxillary scaly; premaxillaries, mandible and branchiostegal membranes without scales; scales on fins smaller than those on body; dorsal and anal confluent with the caudal, a slight notch in tip of caudal; dorsal and anal low, about equal in height to diameter of eye; ventrals composed of a single bifid ray reaching to below posterior edge of head.

Color in alcohol, dusky olive with a brownish tint on back; several rows of very obscure round brownish spots on body, most distinct on tail, almost imperceptible when the fish is dry; fins body color; dorsal narrowly margined with gray; anal rather broadly margined with purplish black shading into body color.

This species is quite distinct from *B. barbata*, the Atlantic form. It is slenderer than that species or either of the Hawaiian species, and is the only species of the genus recorded from the Pacific coast of America.

Genus PORICHTHYS Girard.

183. PORICHTHYS AFUERAE, new species.

Plate 14, fig. 1.

One specimen, field No. 09489*b*, 12.6 cm. in length, from Lobos de Afuera.

Type.—Cat. No. 77552, U. S. Nat. Mus.

Head 3 (3.6 total) in length; depth 5.1 (6.1); eye 5.83 in head; snout 4; maxillary 2.05; interorbital 3.3; pectoral 1.1; ventral 2.84; D. II, 33; A. 31; V. I, 2.

Body slender, compressed, tapering; head long, depressed, its breadth 1.58 in length; interorbital broad, flat; lower jaw projecting; snout rounded; teeth in lower jaw in a single row, unequal, canine-like, recurved, those in upper jaw smaller, equal in size; teeth on palatines in a single long row; two strong recurved teeth on the sides of the vomer, in the same straight line with the palatine row and separated from them by a slight interspace, the second of these much longer than the first; eye small, about 2 in interorbital width; opercular spine long and slender, only the tip projecting through the integument. In this species the lines of phosphorescent organs are essentially the same as in *P. margaritatus*, but much smaller and less clearly defined, in some places being almost invisible.

Dorsal and anal uniform in height, not confluent with the caudal; caudal rounded; ventrals short, anterior in their insertion, tips barely reaching base of pectorals; pectorals long, as long as that part of head anterior to tip of opercular spine.

Color in alcohol, sides and belly silvery white; back dusky gray, crossed by four broad brownish black saddles, these considerably wider than the interspaces, extending to middle of sides; alternating with the saddles are small spots of the same color; four oblique

brownish black areas on dorsal, corresponding to those on body, these confined to the distal half of the fin; alternating with the first and second, and, with the third and fourth are small black areas on margin of fin; posterior half of caudal black; two indistinct black marginal areas on anal posteriorly, with traces of about four others anteriorly; pectoral brownish at base, bordered by a V-shaped area of white, then a parallel brown area, margin of fin lighter; fins, where they are not marked with brownish black areas, white; top and sides of head brownish black, ventral surface white. This species closely resembles *P. porosus* of the Chilian fauna, but may be readily separated by the much longer head, the length of head in *P. porosus* being, according to Günther, 4.66 in the total length, while in this species it is only 3.41.

We know of no record of *P. porosus* from the coast of Peru and therefore have not included it in this list.

Family GOBIESOCIDAE.

THE CLINGFISHES.

KEY TO GENERA.

a^1. Incisors of lower jaw with entire edges; opercular spine strong; vertebrae about 26 ..... *Gobiesox*, p. 153.

a^2. Incisors of lower jaw tricuspid or serrate (at least in those on sides of jaw); opercular spine weak; vertebrae about 28 ..... *Arbaciosa*, p. 155.

Genus GOBIESOX Lacépède.

184. GOBIESOX SANGUINEUS (Müller and Troschel).

Sicyases sanguineus Müller and Troschel, Wiegmann, Arch Naturg., 1843, p. 298.—Günther, Cat. Fish. Brit. Mus., vol. 3, 1861, p. 494.—Steindachner, Fauna Chilensis, vol. 2, 1898, p. 315.

Gobiesox brevirostris Gay, Hist. Chile, Zool., vol. 2, 1848, p. 335, pl. 9, fig. 1.

Gobiesox sanguineus Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 363.

Six specimens, 7.3–11.5 cm. long (no locality).

Head 2.37 in length; breadth of head 2.81; depth of body 6; eye 5.42 in head; snout 3.16; maxillary 3.8; interorbital 2.53; pectoral as wide as long, 3.16; D. 8; A. 6; C. 8; P. 23; V. 4 (5).

Head and body anteriorly broad and much depressed, compressed posteriorly; caudal peduncle slender, its depth 4.75 in head; head nearly as broad as long, sides converging toward the blunt snout; upper surface of head and interorbital space flat; mouth small, inferior, horizontal; lips fleshy, the lower 3-lobed, somewhat after fashion of *Exoglossum*; maxillary scarcely reaching vertical from anterior border of eye; teeth in each jaw in a single row, those in

front 6 in number; incisors with truncate cutting edge; behind these in each jaw two small canine-like teeth; nostrils small, on level with upper margin of orbit; anterior with a flap, prolonged on posterior side into a fringed tentacle; subopercle projecting backward, ending in a spine, covered with skin; head and body scaleless, covered with a leathery skin; distance from tip of snout to origin of dorsal 1.45 in standard length; longest dorsal ray 3.8 in head; caudal truncate, membranes between rays deeply incised; origin of anal under seventh dorsal ray, the distance from tip of snout to origin of anal 1.27 in standard length; vent anterior in position, separated from anal fin by a distance equal to interorbital space; ventrals in front of pectorals and connected with them; pectorals broad, posterior border convex; disk large, subcircular, longer than broad, its length 1.08 in head and its breadth 1.31.

Color in spirits, coppery red to flesh-color, back crossed by six broad, dark reddish crossbands, the first on nape; second behind pectorals; third in front of dorsal; fourth on base of dorsal; fifth on middle of caudal peduncle and sixth in front of base of caudal; fins yellowish, punctulate with dusky. This description is based on a specimen 11.5 cm. long.

The fin formula of these specimens is somewhat variable; one has D. 8; A. 5; another D. 8; A. 6 and four have D. 9; A. 6.

The following excellent description of the structure of the disk by Günther applies to these specimens:

The whole disk is exceedingly large, subcircular, longer than broad, its length being one-third of the whole length of the fish. The central portion is formed merely by skin, which is separated from the pelvic or pubic bones by several layers of muscle. The peripheric portion is divided into an anterior and posterior part, by a deep notch behind the ventrals. The anterior peripheric portion is formed by the four ventral rays, the membrane between them, and a broad fringe which extends anteriorly from one ventral to the other; this fringe is a fold of skin, containing on each side the rudimentary ventral spine, but no cartilage. The posterior peripheric portion is suspended on each side on the caracoid, the upper bone of which is exceedingly broad, becoming a free, movable plate behind the pectoral. A broad cartilage is firmly attached to it. The lower bone of the coracoid is of a triangular form, and supports a very broad fold of the skin, extending from one side to the other, and containing a cartilage which runs through the whole of that fold. Five processes of the cartilage are continued into the soft striated margin in which the disk terminates posteriorly. The surface of the disk is coated with thick epidermis, like the sole of the foot of higher animals. The epidermis is divided into many polygonal plates; there are no such plates between the roots of the ventral fins. (Günther.)

This species is found on the coasts of Peru and Chile.

As we have no record for the coast of Peru of *Gobiesox marmoratus* of Jenyns, included by Abbott in his fishes of Peru, we have omitted it from our list. It is an abundant species to the southward, around Punta Arenas, Tumbes (Chile), Iquique, and the island of Juan Fernandez, and very probably may be found along the southern coasts of Peru.

Genus ARBACIOSA Jordan and Evermann.

KEY TO SPECIES.

a^1. D. 5; A. 4; head 5 in total length; depth 11 ..... *pyrrhocincla*, p. 155.
a^2. D. 6 or 7; A. 5 or 6; head about 3.8 in total length; depth 7 in same ..... *hieroglyphica*, p. 155.

185. ARBACIOSA PYRRHOCINCLA (Cope).

Sicyases pyrrhocinctus Cope, Proc. Amer. Philos. Soc., vol. 17, 1877, p. 43 [in author's separate, p. 27 (Bur. Fish. Lib. Cope, vol. 5)]; exact locality not preserved.

Arbaciosa pyrrhocinctus Abbott, Marine Fishes of Peru, Proc. Acad. Nat. Sci. Phila., 1899, p. 363.

186. ARBACIOSA HIEROGLYPHICA, new species.

PEJE-SAPO.

Plate 14, fig. 2.

Type.—Cat. No. 77561, U. S. N. M., a specimen 4.1 cm. long, and a paratype 3.1 cm. long, both from Lobos de Afuera, taken from a very small and shallow tide pool in the rocks, measuring about 7 by 6 feet and 1 to 10 inches deep. (Field No. 278.)

Ten specimens, field No. 09448, 2.5 to 3.8 cm. long, from Lobos de Afuera.

Head 3.14 in length; depth 5.66; eye 5.4 in head; snout 3; maxillary 2.7; interorbital 2.57; pectoral 2.16; length of disk 1.35; D. 7; A. 6.

Head and body anteriorly depressed, body posteriorly compressed; caudal peduncle slender, its depth 3 in length of head; head nearly as broad as long; mouth small, inferior; maxillary reaching to vertical from anterior margin of eye; interorbital flat; cheeks tumid; incisors in upper jaw eight, the two in the center of the jaw truncate, those on sides serrate or tricuspid; behind these, at a short distance, a strong canine; six incisors on lower jaw, the two in center truncate, others serrate or tricuspid; distance from tip of snout to origin of dorsal 1.31 in standard length; dorsal low, rounded; caudal rounded; origin of anal behind origin of dorsal; distance from tip of snout to origin of anal 1.33 in standard length.

Ground color yellowish, tinged with olive; back crossed by wavy dark lines and dusky black spots, these irregular in shape and arrangement but tending to form darker crossbands on back; on back above pectorals are 5 black spots in the form of a V, the apex pointing forward, end spots most distinct: indistinct lines extending downward and backward from eye; vertical fins blackish, margined with yellowish.

Paratype 3.8 cm. long, has head 3.14 in length; depth 6.6; eye 6 in head; snout 3; interorbital 3; pectoral 1.75; disk 1.31; tip of snout to origin of dorsal 1.36; tip of snout to origin of anal 1.34; D. 7; A. 5.

Ground color yellowish, lighter on ventral surface; irregular dark lines and small dots of black on back; two small black spots on back above pectoral, separated by a distance slightly greater than interorbital width; a narrow line of brown connecting the eyes; 3 similar diverging lines extending downward and backward from eye; one from eye to slightly in front of angle of mouth, trace of another above this near upper angle of eye.

In these specimens the dorsal has six or seven rays, the anal five or six, and the coloration is quite variable.

This species is distinct from *A. pyrrhocincla* of Cope, the only previously recorded species of this genus from Peru. It appears from the description close to *A. petersii* of Garman, from Panama Bay, wrongly credited by Abbott as coming from Peru.

Family MERLUCCIIDAE.

THE HAKES.

Genus MERLUCCIUS Rafinesque.

187. MERLUCCIUS GAYI (Guichenot).

PEJE-PALO.

Merlus gayi Guichenot in Gay, Hist. Chile, vol. 2, 1848, p. 328, I, Atlas, Zool. Ictiol., pl. 8, fig. 2, 1854; coast of Chile.

Epicopus gayi Günther, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 248.

Gadus australis Hutton, Cat. Fish. New Zealand, p. 45, *Hector*, 1872, p. 115, fig. 72.

Merluccias gayi Hutton, Trans. New Zealand Inst., vol. 5, 1872 (1873), p. 266.

Merluccius gayi Günther, Cat. Fish. Brit. Mus., vol. 4, 1862, p. 346.—Steindachner, Fauna Chilensis, 1898, p. 325.—Delfin, Cat. Peces de Chile, 1901, p. 100; Contribucion, Ictiol. Chilena, Rev. Chilena Hist. Nat., vol. 7, 1903, No. 5–6, p. 269, fig. 7.

Four specimens, field No. 471, 16 to 17.5 cm. in length, and five specimens, field No. 472, 16 to 17 cm. in length, from Callao; also one specimen, field No. 09539, 42.5 cm. in length, from Paita.

Head 3.08 in length; depth 6.52; eye 5.68 in head; snout 3.37; maxillary 2.15; interorbital 3.9; pectoral 1.37; ventrals 2.27; D. 11–38; A. 38.

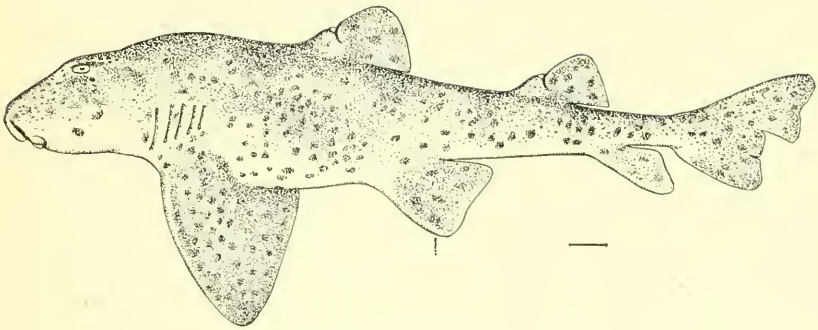
Body elongate, slender, tapering evenly to base of caudal; head long, low; interorbital broad, flat; eye large, posterior border of eye midway between tip of snout and posterior border of opercle; mouth large; lower jaw longest; maxillary reaching vertical from middle of eye; teeth in jaws long, slender, curved, very sharp, mainly in two rows; similar teeth on vomer, none on palatines; opercular bones weak; opercle ending in a weak spine. First dorsal higher than the second; second, third, and fourth rays about equal, longer than others, 2.75 in head; second dorsal and anal each with a deep emargination in the center; caudal rounded; ventrals narrow, their tips reaching two-thirds distance from their base to origin of anal; pectoral long and narrow, tip extending to above sixth anal ray. Scales deciduous, small; lateral line decurved.

Color in alcohol, dusky on back, becoming lighter on belly; fins dusky: some of lower rays of pectoral, black. Description taken from field No. 09539, from Paita.

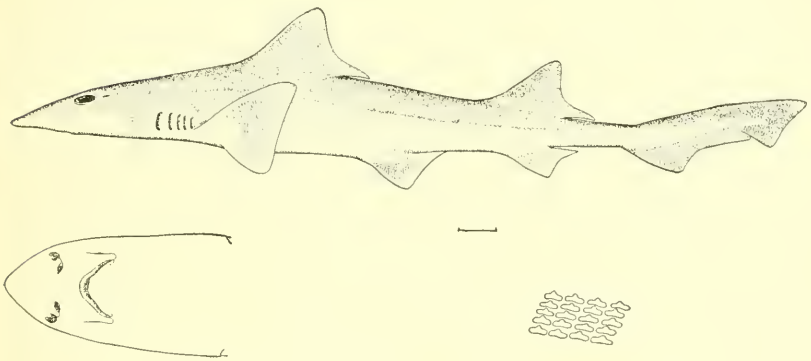
A smaller example from Callao has head 2.9 in length; depth 5.68 eye 5.55 in head; snout 3; interorbital 3.6; pectoral 1.35; ventrals 2.1; D. 11–37; A. 39. Color in alcohol, rosy, dusky on back, silvery on belly; opercle blackish; fins blackish; anterior anal rays and shortened rays in center of second dorsal and anal, whitish.

Guichenot's figure of this species does not show the shortened rays in the center of second dorsal and anal.

This species is very close to the northern Pacific form, *M. productus*, and occurs on the coasts of Peru and Chile.

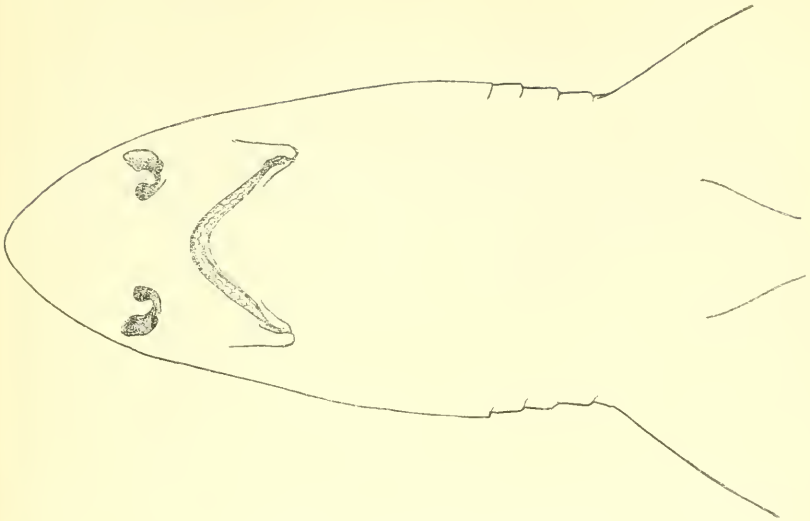


1. GYROPLEURODUS PERUANUS. FROM THE TYPE. (PAGE 2.)

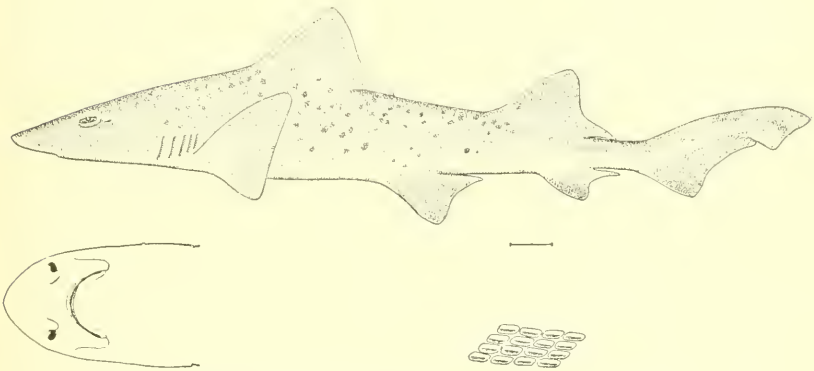


2. MUSTELUS ABBOTTI. FROM THE TYPE. (PAGE 6.)

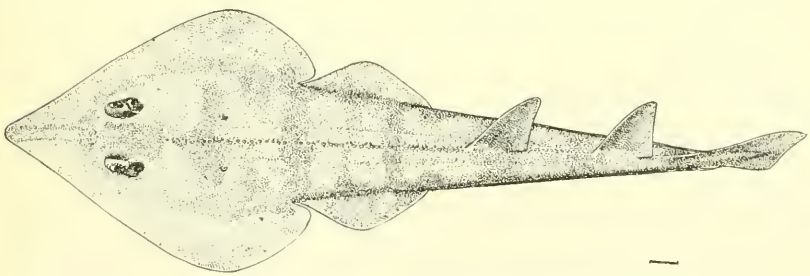
3. MUSTELUS DORSALIS GILL. (PAGE 7.)



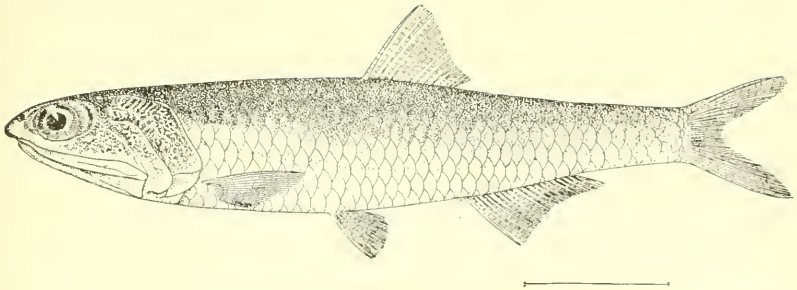
1. MUSTELUS DORSALIS GILL. (PAGE 7.)



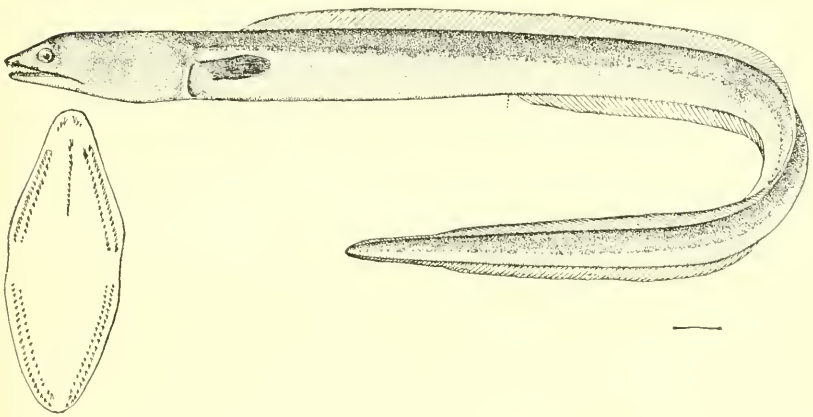
2. MUSTELUS NIGROMACULATUS. FROM THE TYPE. (PAGE 9.)



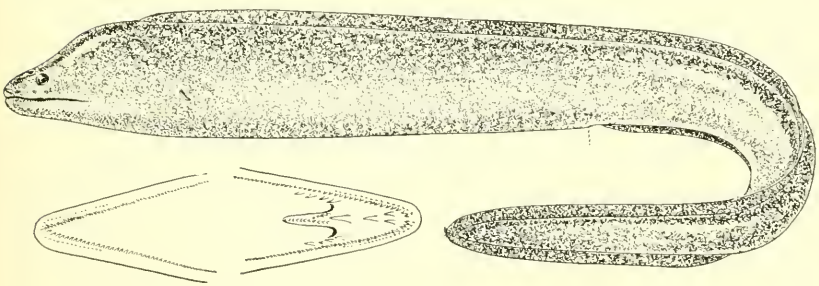
3. RHINOBATUS PLANICEPS GARMAN. (PAGE 12.)



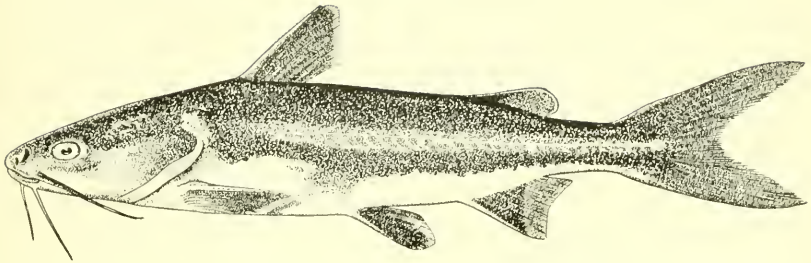
1. ENGRAULIS RINGENS JENYNS. (PAGE 23.)



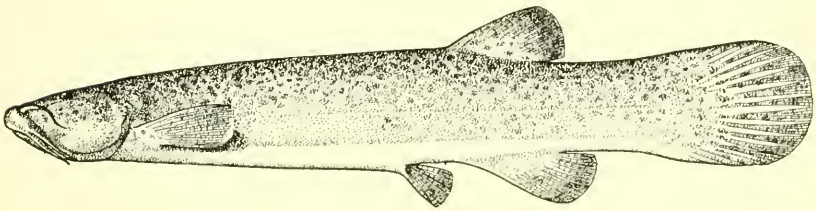
2. OPHICHTHUS PACIFICI (GÜNTHER). (PAGE 25.)



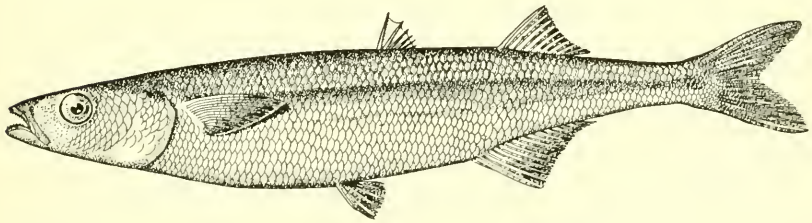
3. GYMNOTHORAX WIENERI (SAUVAGE). (PAGE 26.)



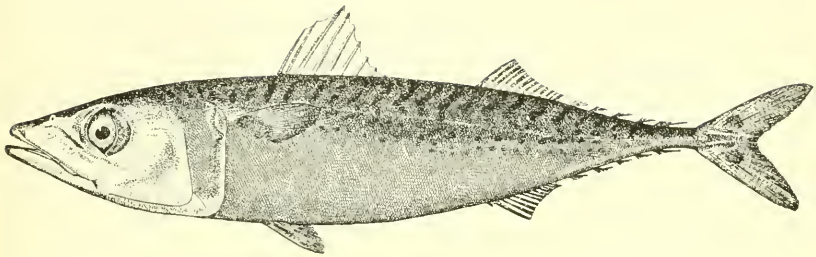
1. GALEICHTHYS PERUVIANUS LÜTKEN. (PAGE 31.)



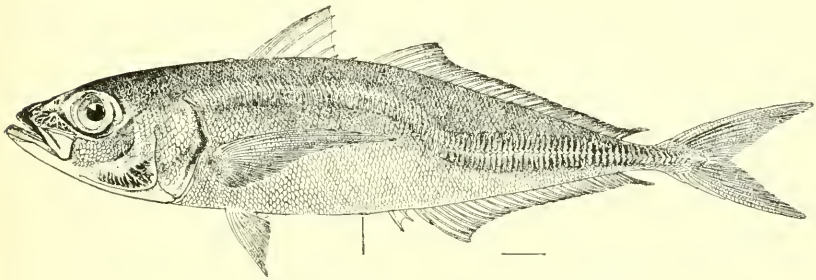
2. PYGIDIUM OROYAE EIGENMANN AND EIGENMANN. (PAGE 35.)



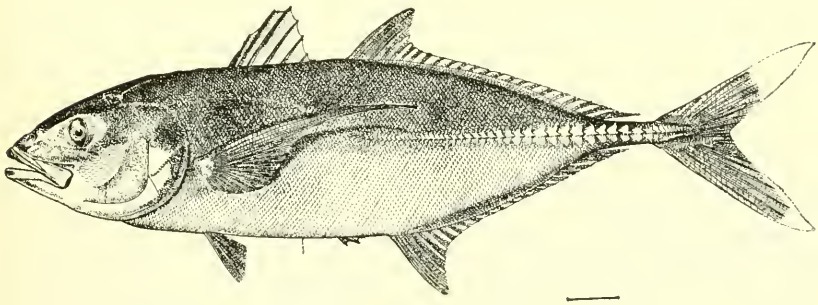
3. BASILICHTHYS AFFINIS (STEINDACHNER). (PAGE 47.)



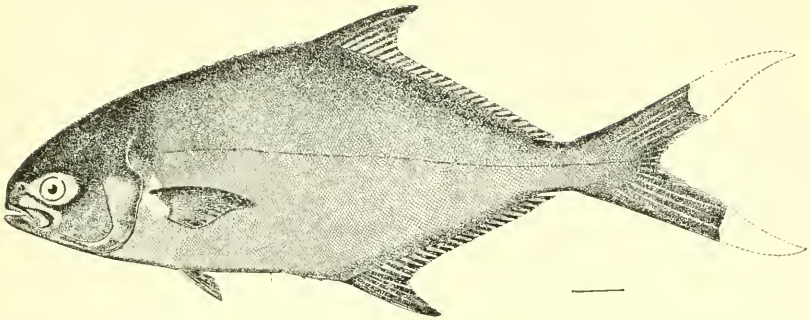
1. SCOMBER JAPONICUS HOUTTUYN. (PAGE 54.)



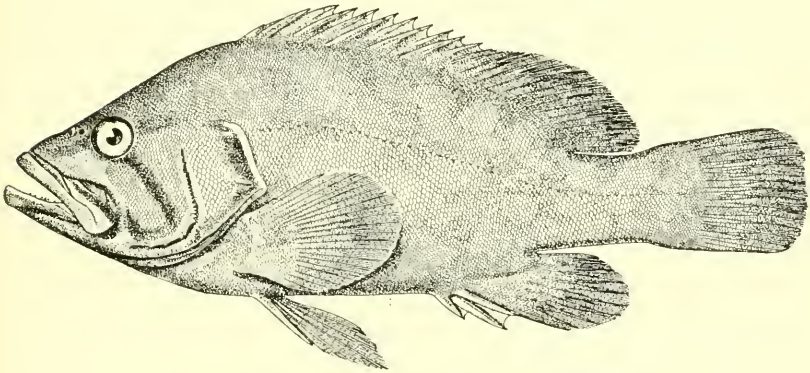
2. TRACHURUS SYMMETRICUS (AYRES). (PAGE 59.)



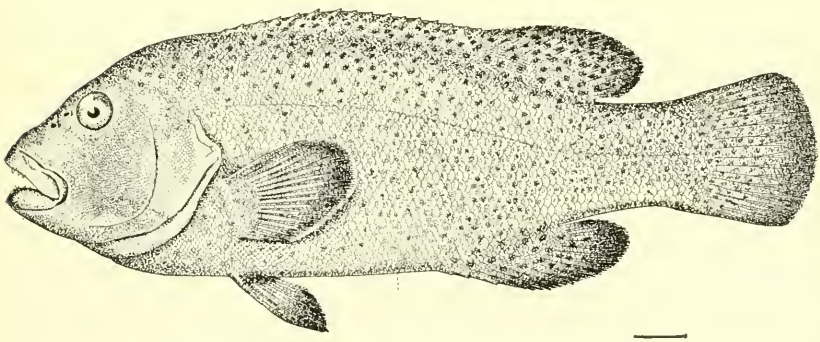
3. CARANX CABALLUS (GÜNTHER). (PAGE 61.)



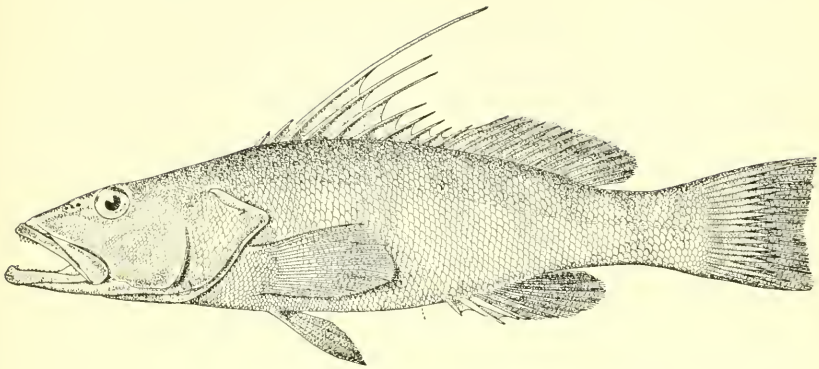
1. TRACHINOTUS PALOMA JORDAN AND STARKS. (PAGE 62.)



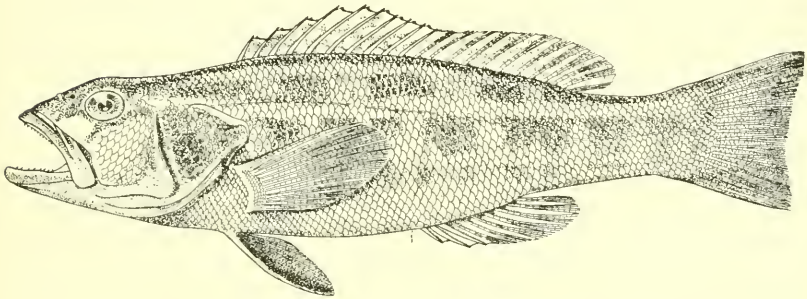
2. ACANTHISTIUS PICTUS (TSCHUDI). (PAGE 66.)



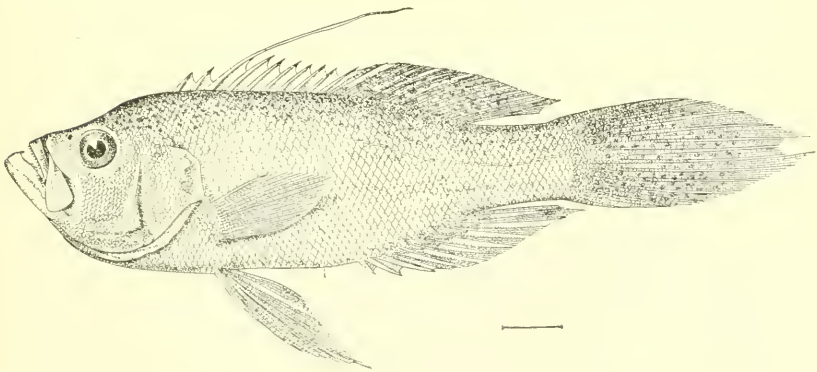
3. EPELYTES PUNCTATUS. FROM THE TYPE. (PAGE 71.)



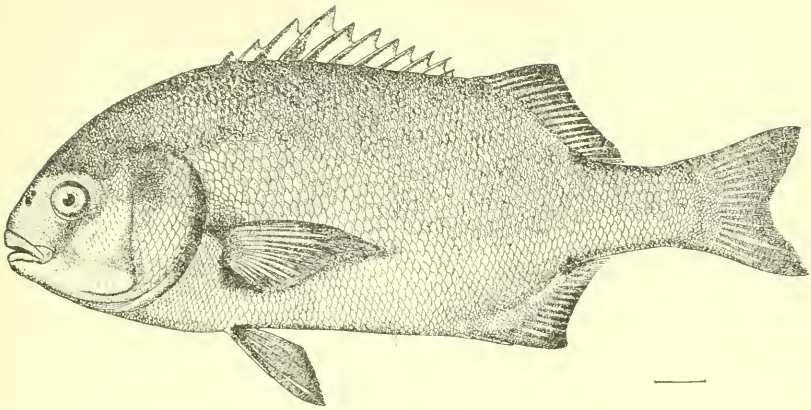
1. CRATINUS AGASSIZII STEINDACHNER. (PAGE 72.)



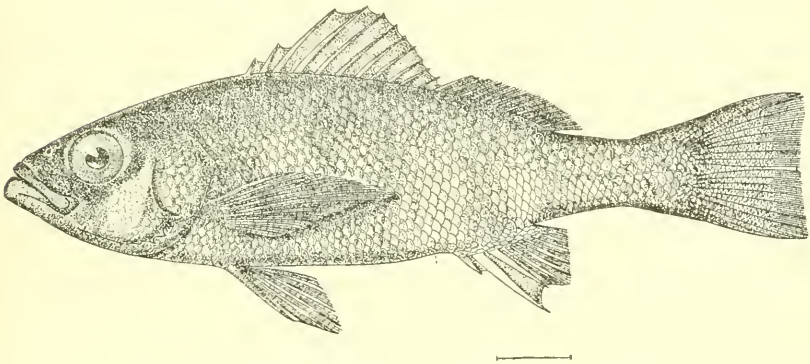
2. DIPLECTRUM CONCEPTIONE (CUVIER AND VALENCIENNES). (PAGE 75.)



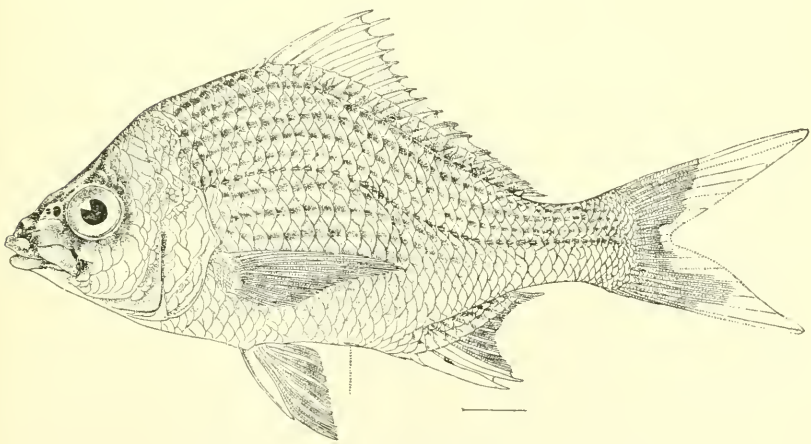
3. HEMIANTHIAS PERUANUS STEINDACHNER. (PAGE 79.)



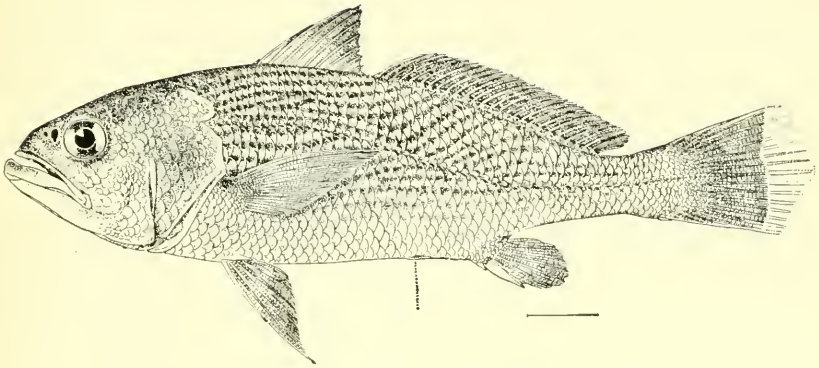
1. ANISOTREMUS SCAPULARIS (TSCHUDI). (PAGE 81.)



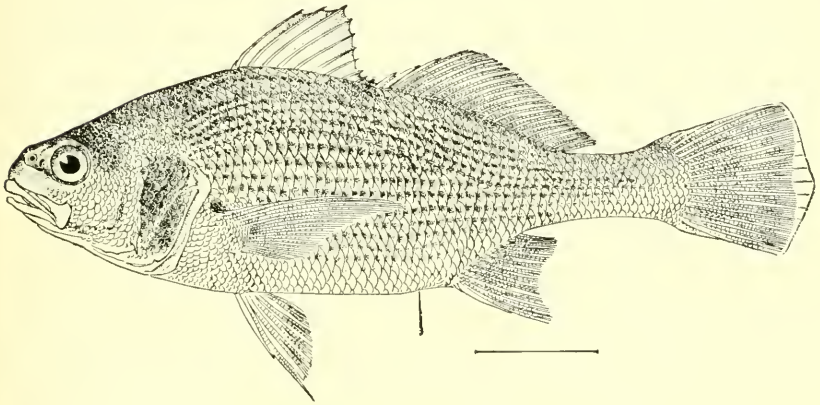
2. CONODON SERRIFER JORDAN AND GILBERT. (PAGE 82.)



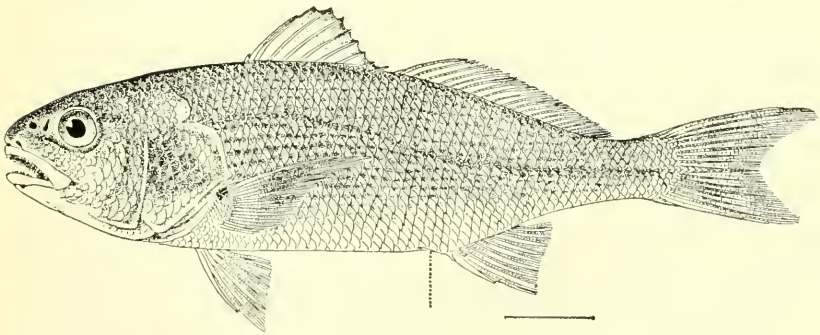
3. GERRES PERICHE. FROM THE TYPE. (PAGE 93.)



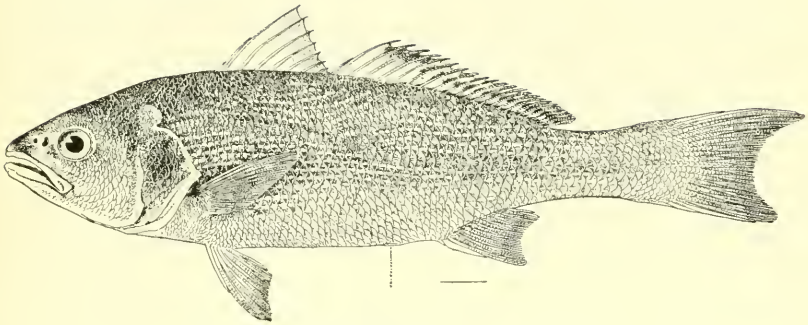
1. LARIMUS PACIFICUS JORDAN AND BOLLMAN. (PAGE 98.)



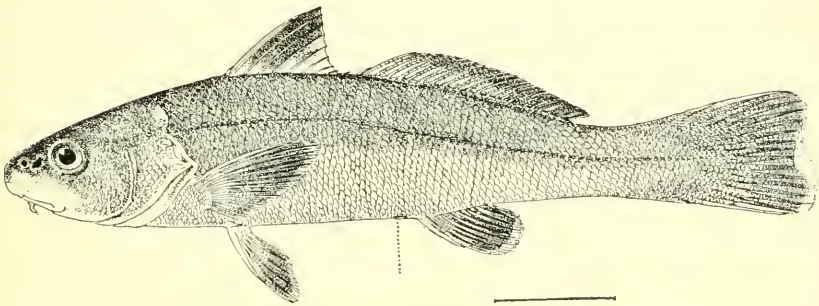
2. STELLIFER MINOR (TSCHUDI). (PAGE 99.)



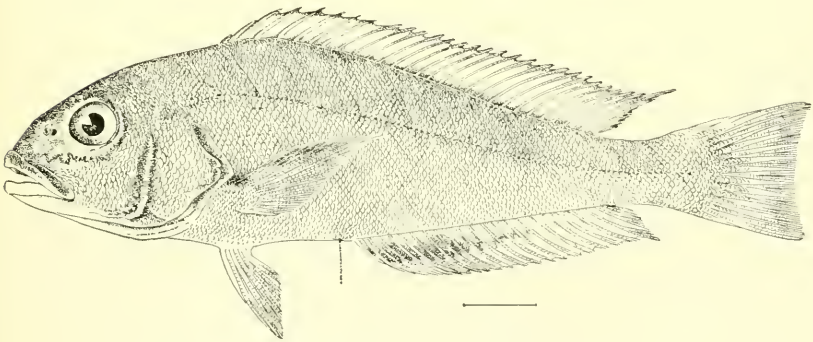
3. SCIAENA DELICIOSA (TSCHUDI). (PAGE 102.)



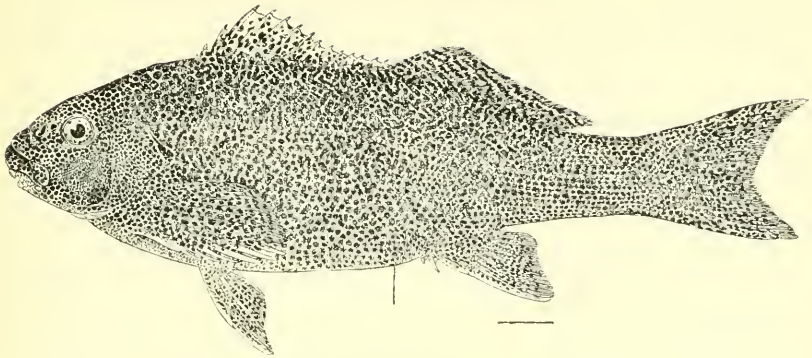
1. SCIAENA GILBERTI ABBOTT. (PAGE 103.)



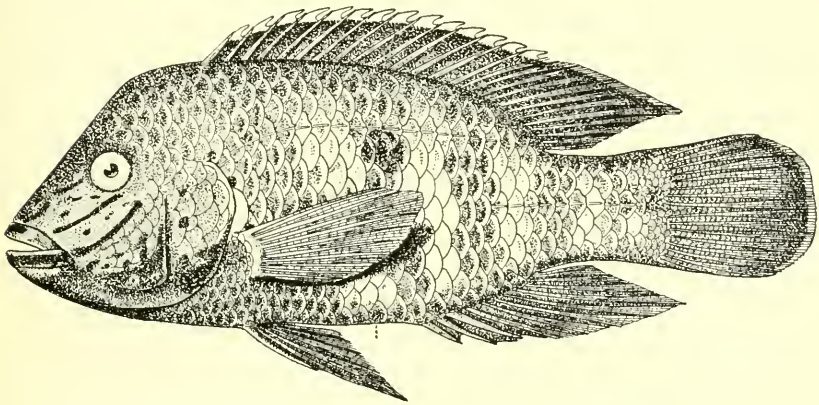
2. MENTICIRRHUS COKERI. FROM THE TYPE. (PAGE 107.)



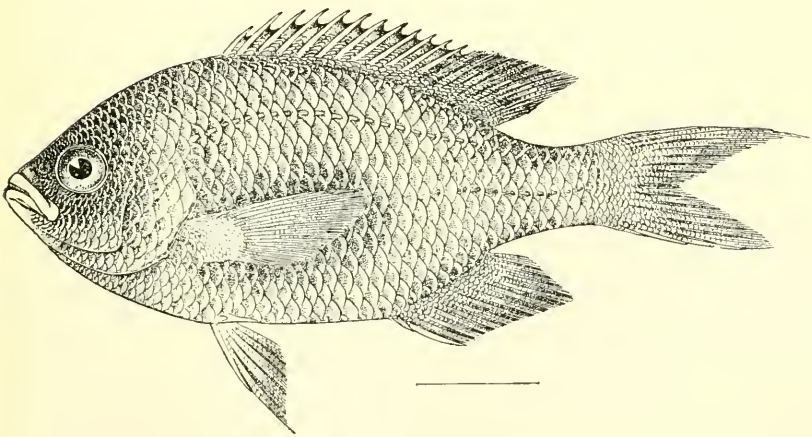
3. CAULOLATILUS CABEZON. FROM THE TYPE. (PAGE 111.)



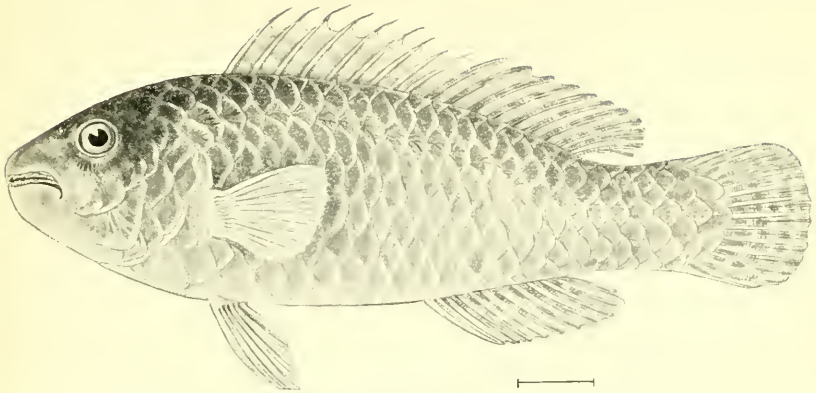
1. APLODACTYLUS PUNCTATUS CUVIER AND VALENCIENNES. (PAGE 115.)



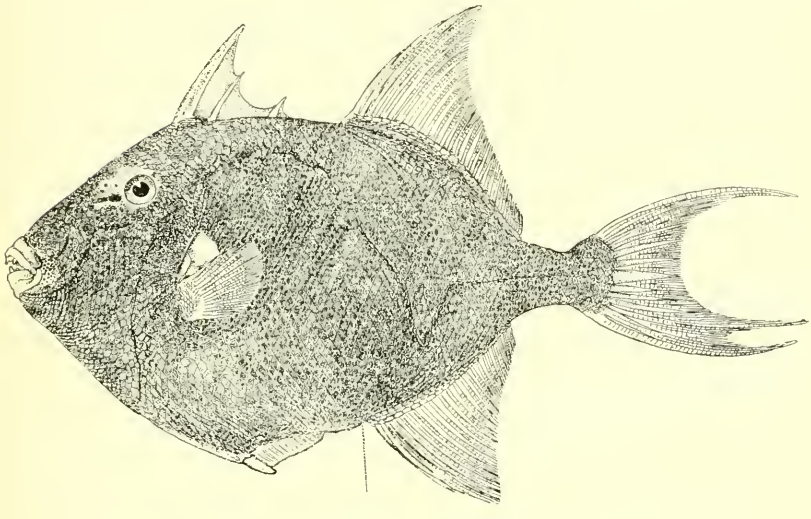
2. AEQUIDENS RIVULATUS (GÜNTHER). (PAGE 116.)



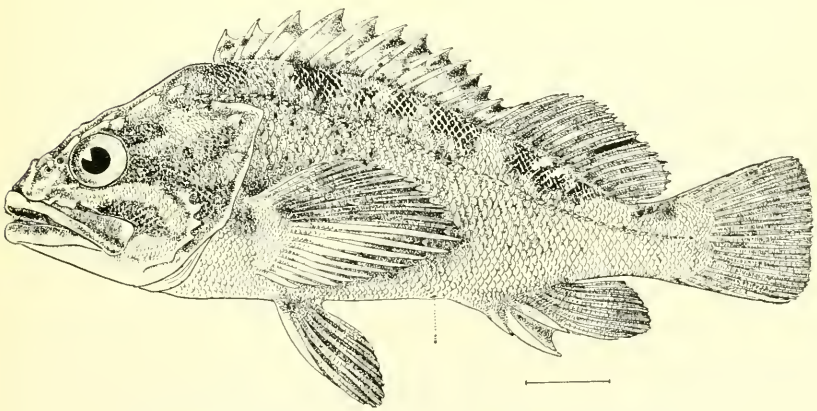
3. CHROMIS INTERCRUSMA. FROM THE TYPE. (PAGE 119.)



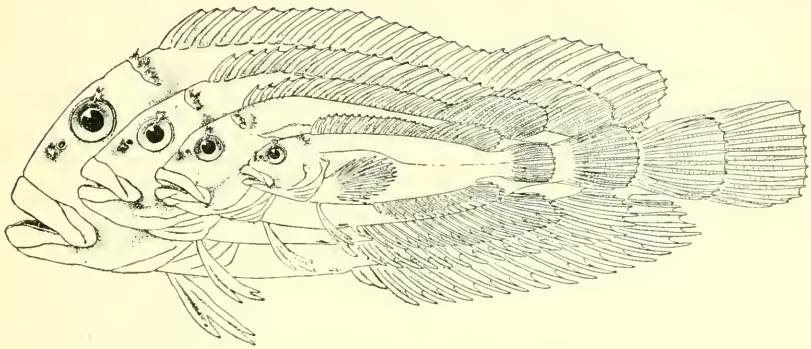
1. XENOSCARUS DENTICULATUS. FROM THE TYPE. (PAGE 129.)



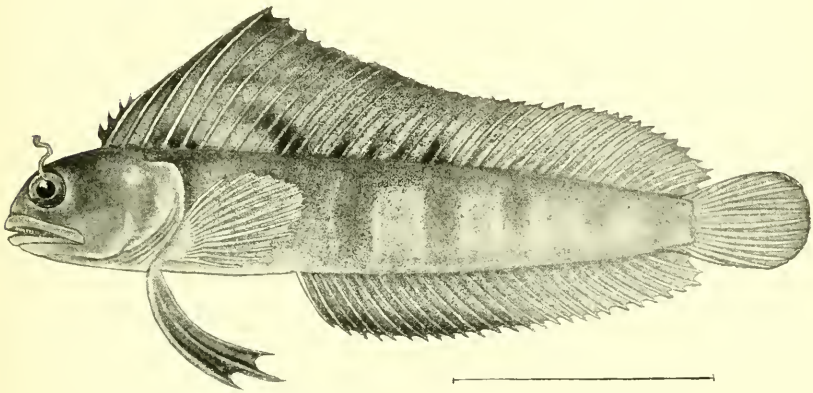
2. BALISTES POLYLEPIS STEINDACHNER. (PAGE 131.)



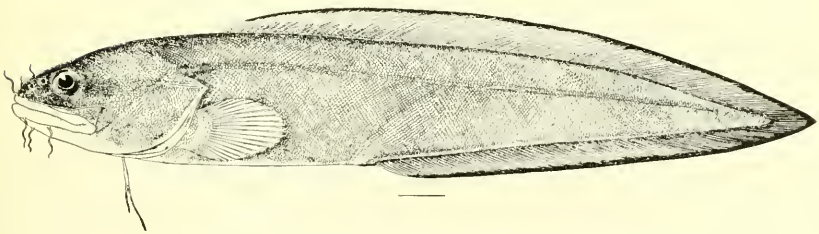
3. SEBASTICHTHYS CHAMACO. FROM THE TYPE. (PAGE 136.)



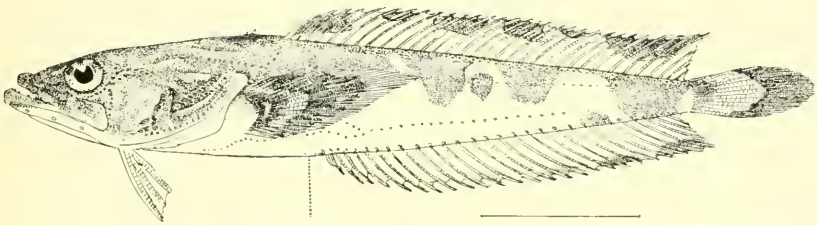
1. LEPISOMA PHILIPPI (STEINDACHNER). (PAGE 144.)



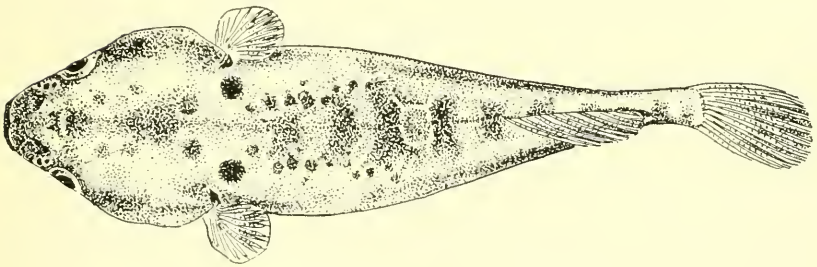
2. EMBLEMARIA HUDSONI. FROM THE TYPE. (PAGE 147.)



3. BROTULA MACULATA. FROM THE TYPE. (PAGE 151.)



1. PORICHTHYS AFUERAE. FROM THE TYPE. (PAGE 152.)



2. ARBACIOSA HIEROGLYPHICA. FROM THE TYPE. (PAGE 155.)

INDEX.

Page.

abbotti, Mustelus 6, 9, 10
Abudefduf 123
marginatus 123
saxatilis 123
Acanthistius 66
pictus 66
Acara pulchra 116
rivulata 116
acclivis, Larimus 99
aciculare, Siphostoma 53
acicularis, Syngnathus 53
adspersus, Balistes 131, 132
Canthidermis 131
Paralichthys 140
Pseudorhombus 140
Aequidens 116
rivulatus 116, 117
affine, Chirostoma 47
affinis, Basilichthys 47
afrum, Plectropoma 69
afuerae, Porichthys 152
agassizii, Corvina 99
Corvina (Homoprion) 99
Cratinus 72
Orestias 40
Serranus 72
Stellifer 99
Agriopus 139
peruanus 139
peruvianus 139
aguja, Raja 14
Alausa fimbriata 20
albemarleus, Nexilosus 121, 123
albus, Orestias 42
Alphestes 69
multiguttatus 69, 70
pictus 66
Alticus 146
gigas 146
altipinnis, Ancylodon 96
Archoscion 96
Cynoscion 96
Amblyopus broussonetii 134
(Gobioides) peruanus 134
Amia 64
dovii 65
retrosella 64
analis, Archoscion 96
Cynoscion 96
Isopisthus 96
Otolithus 96
Umbrina 106
Anchisomus geometricus 132

Page.

Ancylodon altipinnis 96
angulosus, Canthidermis 131, 132
Anisotremus 80
pacifici 80
(Paracanodon) pacifici 81
scapularis 81
annulatus, Spheroides 132
Tetrodon 132
antarctica, Chimaera 18
antarcticus, Callorhynchus 18
Anthias (Hemianthias) peruanus 79
peruanus 79
Aplocheilus 37
peruanus 37
Aplodactylus 115
guttatus 115
punctatus 115
reginae 115
vermiculatus 115
approximans, Polydactylus 52
Polynemus 52
Arbaciosa 155
hieroglyphica 155
petersii 156
pyrrhocincla 155, 156
pyrrhocinctus 155
archaeus, Gastropterus 45, 46, 47
Archoscion altipinnis 96
analis 96
peruanus 96
Arges simonsii 37
asper, Labrus 127
asperrimus, Myliobatis 17
Astyanax 27
peruanus 27, 28, 117
Atherina regia 45
microlepidota 45, 46
Atherinopsis 45
californiensis 46
regius 45, 46 48
atricaudatus, Brycon 27
Chalceus 27
atrilobata, Chromis (Furcaria) 117
atrilobatus, Chromis 117
Auchenionchus crinitus 145
australis, Gadus 156
Galeus 8
bairdii, Orestias 39
Balistes 131
adspersus 131, 132
naufragium 131
polylepis 131
barbata, Brotula 152

	Page.
barbatula, Trichomycterus	34
Basilichthys affinis	47
jordani	47, 48, 49
octavius	48, 49
regillus	47, 48, 49
beardsleei, Gastropterus	45
Pisciregia	45, 46
Belone stolzmanni	43
bimaculata, Lebiasina	29, 117
blacodes, Genypterus	149, 150, 151
Ophidium	149
blainvillei, Leptonotus	53
blainvilliana, Siphostoma	53
blainvillianus, Leptonotus	53
Syngnathus	53
(Leptonotus)	53
Blennius	146
(Hypleurochilus) paytensis	146
tetranemus	146
Bodianus	123
diplotaenius	124, 125, 127
eclancheri	125, 127
boops, Caranx	61
Brachydeuterus	83
leuciscus	84
nitidus	83
branicki, Pomadasis	86
Pristipoma	86
brevicaudatus, Psammobatis	16
brevimanus, Gerres	94
brevirostris, Gobiesox	153
Brotula	151
barbata	152
maculata	151
broussonetii, Amblyopus	134
Gobioides	136
Brycon	27
atricaudatus	27
burgeri, Raja	14
burro, Pomadasis	86
caballus, Caranx	61
cabezon, Caulolatilus	111
Calamus	91
taurinus	91
californica, Squatina	11
californicus, Myliobatis	17
californiensis, Atherinopsis	46
callaensis, Ophichthus	25
Paralabrax	74, 75
Callorhynchus	18
antarcticus	18
callorhynchus	18
callorhynchus, Callorhynchus	18
Chimaera	18
cantharinus, Orthopristis	88
Canthidermis	131
adspersus	131
angulosus	131, 132
Caranx	61
boops	61
caballus	61
girardi	61
peruanus	62
scombrinus	58
symmetricus	59
(Trachurus) cuvieri	59
Caulolatilus	110
cabezon	111
princeps	110
Centrolophus peruanus	63
cephalus, Mugil	49, 117
Chaetodon saxatilis	123
Chaetostoma loborhynchus	37
Chaetostomus	37
loborhynchus	37
chalceum, Pristipoma	87
Chalceus atricaudatus	27
chalceus, Orthopristis	87, 88
chamaco, Sebastichthys	136
charlottae, Mugil	50
Cheilodactylus	113
cinctus	113
variegatus	113
Cheilotrema fasciatum	101
chilense, Scyllium	3
chilensis, Esox	112
Exocoetus	44
Genypterus	150, 151
Halaelurus	3
Pelamys	55
Pinguipes	112
Sarda	55
Scyliorhinus	3
Chimaera antarctica	18
callorhynchus	18
Chirostoma affine	47
Chromis	117
atrilobatus	117
crusma	118, 121
(Furcaria) atrilobata	117
intercrusma	119, 120
rivulata	116
Chrysophrys cyanoptera	91
taurina	91
chrysops, Latilus	112
ciliilabis, Myxus	51
Neomyxus	51
cinctus, Cheilodactylus	113
cinereum, Xystaema	91, 92
Citharichthys	141
gilberti	141
Clinus fortidentatus	144
microcirrhis	146
peruvianus	145
philippi	144
Clupanodon fimbriata	20
fimbriatus	20
sagax	20
Clupea (Alosa) notacanthoides	19
notachanthus	19
sagax	20
stolifera	21
cokeri, Menticirrhus	107
colias, Scomber	54
conceptione, Diplectrum	75
conceptionis, Isacia	89
Pristipoma	89
Serranus	75
Conodon	82
nobilis	83
pacifici	81
plumieri	82

	Page.
Conodon, serrifer	82
Corvina agassizii	99
deliciosa	102
fasciata	101
(Homoprion) agassizii	99
minor	99, 100
Cossyphus darwinii	127
eclancheri	125
crassus, Neptomenus	57
Cratinus	72
agassizii	72
crebripunctata, Pteroplatea	16
cretense, Sparisoma	129
crinitus, Auchenionchus	145
Lepisoma	146
crusma, Chromis	118, 121
Heliases	118, 120
Heliastes	118
cuvieri, Caranx (Trachurus)	59
Orestias	38
cuvierii, Orestias	38
cyanoptera, Chrysophrys	91
Cyclopium simonsii	37
Cynoscion	96
altipinnis	96
analis	96
peruanus	96
phoxocephalum	97
phoxocephalus	97
stolzmanni	97
Cypsilurus	44
speculiger	44
darwini, Sebastodes	137
darwinii, Cossyphus	127
Pimelometopon	127
Trochocopus	127
Decapterus	58
sanctachelenae	59
scombrinus	58, 59
Decapturus scombrinus	58
deliciosa, Corvina	102
Sciaena	102
denticulatus, Xenoscarus	129
Diplectrum	75
conceptione	75
diplotaenia, Harpe	124
diplotaenius, Bodianus	124, 125, 127
Discopyge	16
tschudii	16
dispar, Pygidium	35
Trichomycterus	34
var, punctulatum, Pygidium	36
dispersus, Paralichthys	141
dispilus, Iridio	128
Platyglossus	128
dorsalis, Mustelus	67
dovii, Amia	65
Doydixodon	94
fasciatum	94
freminvillei	95
laevifrons	94
dubius, Pontinus	138
Echeneis	135
remora	135
eclancheri, Bodianus	125, 127
Cossyphus	125

	Page.
eclancheri, Harpe	125
ectenes, Etropus	142
edulis, Mustelus	6
elegans, Orestias	40
Emblemaria	147
hudsoni	147
nivipes	148
Engraulis	23
nasus	24
peruanus	23
ringens	23, 24
tapirulus	23
Epelytes	71
punctatus	71
Epicopus gayi	156
Epinephelus	59
labriformis	69
multiguttatus	70
xenarchus	70
equatorialis, Tachysurus	32
Esox chilensis	112
Etropus	142
ectenes	142
Eupomacentrus latifrons	121
exiliens, Exocoetus	44
Exocoetus	44
chilensis	44
exiliens	44
exsiliens	44
rufipinnis	44
speculiger	44
volitans	44
Exoglossum	153
exsiliens, Exocoetus	44
fasciata, Corvina	101
Sciaena	110
fasciatum, Cheilotrema	101
Doydixodon	94
fasciatus, Oplegnathus	110
Prionodes	77
fimbriata, Alausa	20
Clupanodon	20
Sardinella	20
fimbriatus, Clupanodon	20
fortidentatus, Clinus	144
francisci, Gyropleurodus	3
freminvillei, Doydixodon	95
frontosus, Orestias	40
furcifer, Serranus	78
furcirhinus, Pontinus	138
gabonensis, Vomer	62
Gadus australis	156
Galeichthys	30
jordani	31, 32
peruvianus	31
simonsi	31
Galeorhinus mento	6
zyopterus	10
Galeus	10
australis	8
dorsalis	6, 7
mento	6
zyopterus	10
Gastropterus archaeus	45, 46, 47
beardsleei	45
gayi, Epicopus	156

Page.

gayi, Merluccias 156
Merluccius 156
Merlus 156
Genyanemus peruanus 108
Genypterus 149
blacodes 149, 150, 151
chilensis 150, 151
nigricans 150
geometricus, Anchisomus 132
Gerres 92
brevimanus 94
lineatus 93
periche 93
peruvianus 92
simillimus 91
gigas, Alticus 146
Salarias 146
Scartichthys 146
gilberti, Citharichthys 141
Sciaena 103, 104, 105
gilli, Rhamdia 33
girardi, Caranx 61
gladius, Xiphias 56
Xiphius 56
Glyphidodon latifrons 121
Glyphisodon saxatilis 123
Gobiesox 153
brevirostris 153
marmoratus 155
sanguineus 153
Gobioides broussonetii 134, 135
peruanus 134, 135
Gobius soporator 134
gracilis, Trichomcyterus 31
grandimaculatus, Ophichthus 24
guttatus, Aplodactylus 115
Gymnothorax 26
wieneri 26
Gyropleurodus francisci 3
peruanus 2
quoyi 3
Haemulon modestum 88
Halaelurus 3
chilensis 3
Halichoeres 120
Haplocheilus peruanus 37
Haplodactylus punctatus 115
Harengula 21
moluccensis 22
stolifera 21
Harpe diplotaenia 124
eclancheri 125
Heliases crusma 118, 120
Helastes crusma 118
Hemianthias 79
peruanus 79
Hemilutjanus 67
macrophthalmos 67
paytensis 75
Hemirhamphus unifasciatus 43
hieroglyphica, Arbaciosa 155
histrio, Scorpaena 137
Holorhinus vespertilio 17
huascarii, Prionodes 78
hudsoni, Emblemaria 147
humeralis, Paralabrax 73, 75
Serranus 73

Page.

Hypleurochilus 146
paytensis 146
Hyporhamphus 43
unifasciatus 43
idiastes, Sphyraena 51
illecebrosus, Stellifer 100
incae, Orestias 42
Trichomycterus 34
insigne, Oplegnathus 109
Scarostoma 109
insignis, Oplegnathus 109
insignus, Oplegnathus 109
intercrusma, Chromis 119, 120
Iridio dispilus 128
Isacia 89
conceptionis 89
venusta 89
Isopisthus analis 96
japonicus, Scomber 54
jenkinsi, Lepisoma 145
jordani, Basilichthys 47, 48, 49
Galeichthys 31, 32
jussiei, Orestias 42
jussieui, Orestias 42
labriformis, Epinephelus 69
Serranus 69
Labrisomus microcirrhis 146
philippi 144
xanti 143
Labrosomus xanti 143
Labrus asper 127
laevifrons, Doydixodon 94
Pimelepterus 94
Larimus 98
acclivis 99
pacificus 98
lateralis, Philypnus 133
laticeps, Pygidium 35
latifrons, Eupomacentrus 121
Glyphidodon 121
Nexilosus 121
Pomacentrus 121
Latilus chrysops 112
princeps 110
Lebiasina 29
bimaculata 29, 117
Leirus 63
peruanus 63
Lembus maculatus 133
Lepisoma 143
crinitus 146
jenkinsi 145
microcirrhis 146
peruviana 145
philippi 144, 145, 146
variolosus 145, 146
xanti 143, 144, 147
Leptocephalus 24
multimaculatus 24
peruanus 24
Leptonotus blainvillei 53
blainvillianus 53
leuciscus, Brachydeuterus 84
var. elongatus, Pristipoma 84
Pomadasis 84
leuciscus, Pristipoma 84
lineatus, Gerres 93, 94
Lirus peruanus 63

Page.

liza, Mugil ... 50
loborhynchus, Chaetostoma ... 37
Chaetostomus ... 37
luteus, Orestias ... 42
Lycodontis wieneri ... 26
macracanthus, Pomadasis ... 86
macrophthalmos, Hemilutjanus ... 67
Plectropoma ... 67
Pomodon ... 68
maculata, Brotula ... 151
maculatum, Ophidium ... 149
maculatus, Lembus ... 133
Philypnus ... 133
Stromateus ... 64
malleus, Zygaena ... 5
Mapo ... 134
soporator ... 134
margaritatus, Porichthys ... 152
marginatus, Abudefduf ... 123
marmoratus, Gobiesox ... 155
mediterraneus, Trachurus ... 60
Menticirrhus ... 106
cokeri ... 107
panamensis ... 106, 107
mento, Galeorhinus ... 6
Mustelus ... 6
Merluccias gayi ... 156
productus ... 157
Merluccius ... 156
gayi ... 156
Merlus gayi ... 156
mexicanus, Mugil ... 50
microcirrhis, Clinus ... 146
Labrisomus ... 146
Lepisoma ... 146
microlepidota, Atherina ... 45, 46
microphthalmus, Tetragonopterus ... 28
minor, Corvina ... 99, 100
Sciaena ... 99
Stellifer ... 99
Stelliferus ... 99
modestum, Haemulon ... 88
modestus, Orthopristis ... 88
moluccensis, Harengula ... 22
Mugil ... 49
cephalus ... 49, 117
charlottae ... 50
liza ... 50
mexicanus ... 50
rammelsbergii ... 50
mulleri, Orestias ... 40
multiguttatum, Plectropoma ... 69
multiguttatus, Alphestes ... 69, 70
multimaculatus, Leptocephalus ... 24
Mustelus ... 5
abbotti ... 6, 9, 10
dorsalis ... 6, 7
edulis ... 6
mento ... 6
nigromaculatus ... 9
Mycteroperca ... 70
xenarcha ... 70
Myliobatis ... 17
Myliobatis, asperrimus ... 17
californicus ... 17
Myxus ciliilabis ... 51
nasus, Engraulis ... 23

Page.

naufragium, Balistes ... 131
Neomyxus ... 51
ciliilabis ... 51
Neptomenus ... 57
crassus ... 57
neveui, Orestias ... 42
Nexilosus ... 121
albemarleus ... 121, 123
latifrons ... 121
nigricans, Genypterus ... 150
nigromaculatus, Mustelus ... 9
nitidum, Pristipoma (Haemulopsis) ... 83
nitidus, Brachydeuterus ... 83
Pomadasis ... 83
nivipes, Emblemaria ... 148
nobilis, Conodon ... 83
notacanthoides, Clupea (Alosa) ... 19
Potomalosa ... 19
notachanthus, Clupea ... 19
octavius, Basilichthys ... 48, 49
oculata, Sebastes ... 137
Sebastichthys ... 137
olivaceus, Orestias ... 42
Ophichthus ... 24
callaensis ... 25
grandimaculatus ... 24
pacifici ... 25, 26
uniserialis ... 25, 26
Ophichthys callaensis ... 25
uniserialis ... 25
Ophidium blacodes ... 149
blancodes ... 149
maculatum ... 149
Oplegnathus ... 109
fasciatus ... 110
insigne ... 109
insignis ... 109
insignus ... 109
Orestias ... 37
agassizii ... 40
albus ... 42
bairdii ... 39
cuvieri ... 38, 39
cuvierii ... 38
elegans ... 40
frontosus ... 40
incae ... 42
jussiei ... 42
jussieui ... 42
luteus ... 42
mulleri ... 40
neveui ... 42
olivaceus ... 42
ortonii ... 40
owenii ... 42
peutlandii ... 39
tschudii ... 40
oroyae, Pygidium ... 35
Orthopristis ... 87
cantharinus ... 88
chalceus ... 87, 88
modestus ... 88
ortonii, Orestias ... 40
Otolithus analis ... 96
peruanus ... 96
stolzmanni ... 97
owenii, Orestias ... 42

Page.

pacifici, Anisotremus 80
(Paraconodon) 81
Conodon 81
Ophichthus 25, 26
pacificus, Larimus 98
paloma, Trachinotus 62
panamensis, Menticirrhus 106, 107
Umbrina 106
pannosa, Scorpaena 138
Paralabrax 73
callaensis 74, 75
humeralis 73, 75
Paralichthys 140
adspersus 140
dispersus 141
sinaloae 140
woolmani 140
pardum, Pygidium 36
paytensis, Blennius (Hypleurochilus) 146
Hemilutjanus 75
Hypleurochilus 146
Plectropoma 75
Pelamys chilensis 55
pentlandi, Trichomycterus 34
pentlandii, Orestias 39
periche, Gerres 93
peruana, Seriola 58
Zygaena 5
peruanus, Agriopus 139
Amblyopus (Gobioides) 134
Anthias 79
(Hemianthias) 79
Aplocheilus 37
Archoscion 96
Astyanax 27, 28, 117
Caranx 62
Centrolophus 63
Cynoscion 96
Engraulis 23
Genyanemus 108
Gobioides 134, 135
Gyropleurodus 2
Haplocheilus 37
Hemianthias 79
Leirus 63
Leptocephalus 24
Lirus 63
Otolithus 96
Polycirrhus 108
Polyclemus 108
Pronotogrammus 79
Stolephorus 23
Tetragonopterus 27
peruviana, Lepisoma 145
peruvianus, Agriopus 139
Clinus 145
Galeichthys 31
Gerres 92
Tachisurus 31
Tetragonopterus 28
petersii, Arbaciosa 156
philippi, Clinus 144
philippi, Labrisomus 144
Lepisoma 144, 145, 146
Philypnus 133
lateralis 133
maculatus 133

Page.

phoxocephalum, Cynoscion 97
phoxocephalus, Cynoscion 97
Plectoproma macropthalmos 67
pictum, Plectropoma 66
picturatus, Trachurus 59
pictus, Acanthistius 66
Alphestes 66
Trichomycterus 34
Pimelepterus laevifrons 94
Pimelodella 33
yuncensis 33
Pimelometopon 127
darwinii 127
Pinguipes 112
chilensis 112
Pisciregia beardsleei 45, 46, 47
planiceps, Rhinobatus 12
Platyglossus dispilus 128
Plectropoma afrum 69
macrophthalmos 67
multiguttatum 69
paytensis 75
pictum 66
plumieri, Conodon 82
poeyanum, Pygidium 34
poeyanus, Trichomycterus 34
Polycirrhus peruanus 108
Polyclemus 108
peruanus 108
Polydactylus 52
approximans 52
polylepis, Balistes 131
Polynemus approximans 52
Pomacentrus latifrons 121
Pomadasis 85
branicki 86
burro 86
leucisus 84
macracanthus 86
nitidus 83
schyri 85, 86
Pomodon macrophthalmus 68
Pontinus 138
dubius 138
furcirhinus 138
strigatus 139
Porichthys 152
afuerae 152
margaritatus 152
porosus 153
porosus, Porichthys 153
Potamalosa 19
notacanthoides 19
princeps, Caulolatilus 110, 112
Latilus 110
Prionodes 76
fasciatus 77
huascarii 78
Pristipoma branicki 86
chalceum 87
conceptionis 89
(Haemulopsis) nitidum 83
Pristipoma leucisus 84
var. elongatus 84
Pristopomus scapulare 81
productus, Merluccias 157
Pronotogrammus peruanus 79

	Page.
Protistius	46
semotilus	46
Psammobatis	16
brevicaudatus	16
Pseudorhombus adspersus	140
psittacinus, Serranus	77
Pteroplatea	16
crebripunctata	16
pulchra, Acara	116
punctatus, Aplodactylus	115
Epelytes	71
Haplodactylus	115
punctulatum, Pygidium	35, 36
dispar	36
punctulatus, Trichomycterus	35
Pygidium	33
dispar	35
var. punctulatum	36
laticeps	35
oroyae	35
pardum	36
poeyanum	34
punctulatum	35, 36
quechuorum	36
rivulatum	34
taenia	35
pyrrhocincla, Arbaciosa	155, 156
pyrrhocinclus, Arbaciosa	155
Sicyases	155
quechuorum, Pygidium	36
quoyi, Gyropleurodus	3
Raja	13
aguja	14
burgeri	14
steindachneri	14
rammelsbergii, Mugil	50
regia, Atherina	45
regillus, Basilichthys	47, 48, 49
reginae, Aplodactylus	115
regius, Atherinopsis	45, 46, 48
remora, Echeneis	135
Remora	135
retrosella, Amia	64
Rhamdia	33
gilli	33
Rhina squatina	11
Rhinobatus	12
planiceps	12
Rhinoptera vespertilio	17
ringens, Engraulis	23, 24
rivulata, Acara	116
Chromis	116
rivulatum, Pygidium	34
rivulatus, Aequidens	116, 117
Trichomycterus	34
rubropunctatus, Salarias	147
Scartichthys	147
rufipinnis, Exocoetus	44
sagax, Clupanodon	20
Clupea	20
Sardinella	20
Salarias	147
Salarias gigas	146
rubropunctatus	147
sanctachelenae, Decapterus	59
sanguineus, Gobiesox	153
Sicyases	153
Sarda	55
chilensis	55
Sardinella	20
fimbriata	20
sagax	20
stolifera	21
saxatilis, Abudefduf	123
Chaetodon	123
Glyphisodon	123
scabripinnis, Tetragonopterus	28
scapulare, Pristopomus	81
scapularis, Anisotremus	81
Scarostoma insigne	109
Scartichthys gigas	146
rubropunctatus	147
schyri, Pomadasis	85, 86
Sciaena	101
deliciosa	102
fasciata	101
gilberti	103, 104, 105
minor	99
starksi	104, 105
wiencri	105
Scomber	54
colias	54
japonicus	54
Scomberomorus	55
sierra	55
scombrinus, Caranx	58
Decapterus	58, 59
Decapturus	58
Scorpaena histrio	137
pannosa	138
Scyliorhinus chilensus	3
Scylliorhinus chilensis	3
Scyllium chilense	3
Sebastes oculata	137
Sebastichthys	136
chamaco	136
darwini	137
oculata	137
Sebastodes darwini	137
Selene	62
vomer	62
semifasciatus, Serranus	73
semispinosus, Trachurus	60
semotilus, Protistius	46
Seriola	58
peruana	58
Serranus agassizii	72
conceptionis	75
furcifer	78
humeralis	73
labriformis	69
psittacinus	77
semifasciatus	73
serrifer, Conodon	82
setipinnis, Vomer	62
Zeus	62
Sicyases sanguincus	153
Sicyases pyrrhocinclus	155

	Page.
sierra, Scomberomorus	55
simillimus, Gerres	91
simonsi, Galeichthys	31
simonsii, Arges	37
Cyclopium	37
sinaloae, Paralichthys	140
Siphostoma	53
aciculare	53
blainvilliana	53
soporator, Gobius	134
Mapo	134
Sparisoma cretense	129
speculiger, Cypsilurus	44
Exocoetus	44
Spheroides	132
annulatus	132
Sphyraena	51
idiastes	51
Sphyrna	53
zygaena	5
Squalus squatina	11
zygaena	5
Squatina	11
californica	11
squatina	11
squatina, Rhina	11
Squalus	11
Squatina	11
starksi, Sciaena	104, 105
steindachneri, Raja	14
Stellifer	99
agassizii	99
illecebrosus	100
minor	99
Stelliferus minor	99
Stolephorus	22
peruanus	23
tapirulus	23
stolifera, Clupea	21
Harengula	21
Sardinella	21
stolzmanni, Belone	43
Cynoscion	97
Otolithus	97
Tylosurus	43
strigatus, Pontinus	139
Stromateus	64
maculatus	64
symmetricus, Caranx	59
Trachurus	59, 60
Syngnathus acicularis	53
blainvillianus	53
(Leptonotus) blainvillianus	53
Tachisurus peruvianus	31
Tachysurus	32
equatorialis	32
taenia, Pygidium	35
Trichomycterus	35
tapirulus, Engraulis	23
Stolephorus	23
taurina, Chrysophrys	91
taurinus, Calamus	91
Tetragonopterus microphthalmus	28
peruanus	27
peruvianus	28
scabripinnis	28
tetranemus, Blennius	146
Tetrodon annulatus	132
Trachinotus paloma	62

	Page.
Trachurus	59
boops	61
mediterraneus	60
picturatus	59
semispinosus	60
symmetricus	60
trachurus	60
trachurus, Trachurus	60
Trichomycterus barbatula	34
dispar	34
gracilis	34
incae	34
pentlandi	34
pictus	34
poeyanus	34
punctulatus	35
rivulatus	34
taenia	35
Trochocopus darwinii	127
tschudii, Discopyge	16
Orestias	40
Tylosurus	43
stolzmanni	43
Umbrina analis	106
panamensis	106
xanti	105
unifasciatus, Hemirhamphus	43
Hyporhamphus	43
uniserialis, Ophichthus	25, 26
variegatus, Cheilodactylus	113
variolosus, Lepisoma	145
venusta, Isacia	89
vermiculatus, Aplodactylus	115
vespertilio, Holorhinus	17
Rhinoptera	17
volitans, Exocoetus	44
Vomer	62
gabonensis	62
setipinnis	62
vomer, Selene	62
Zeus	62
wieneri, Gymnothorax	26
Lycodontis	26
Sciaena	105
woolmani, Paralichthys	140
xanti, Labrisomus	143
Labrosomus	143
Lepisoma	143, 144, 147
Umbrina	105
xenarcha, Mycteroperca	70
xenarchus, Epinephelus	70
Xenoscarus	129
denticulatus	129
Xiphias	56
gladius	56
Xiphius gladius	56
Xystaema	91
cinereum	91, 92
yuncensis, Pimelodella	33
Zeus setipinnis	62
vomer	62
Zygaena malleus	5
peruana	5
zygaena, Sphyrna	5
Squalus	5
zyopterus, Galeorhinus	10
Galeus	10

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01421 1502